

FREE PLANS GUIDE 350+ MODELS YOU CAN BUILD!

MODEL

Airplane

NEWS

**BIGGEST
ISSUE
EVER!**

65
**HOT NEW
PRODUCTS
FOR 2003!**

page 14

**YOUR
ULTIMATE
FIRST
FLYER**

Pushing
the envelope

**225+
MPH
ACTION!**

page 38

RCX

modelairplanenews.com

A
AirAGE
PUBLISHING

JANUARY 2003

USA \$4.99 CANADA \$7.50



0 71896 48120 4

MODEL Airplane NEWS

JANUARY 2003 VOLUME 131, NUMBER 1

ON THE COVER: this month, our traditional antique cover image is an impressive North American B-25H Mitchell borrowed from the September 1957 issue. The medium bomber/gunship is the work of well-known aviation artist Jo Kotula.

FEATURES

14 New for 2003

We kick off the new year with a special rendition of "Air Scoop"
by the Model Airplane News crew

38 USRA North Coast Challenge

"Gentlemen, start your engines!"
by Rick Bell

88 Discus-Launch Gliders

New Olympics-style technique for impressive results
by Dave Garwood

94 HOW TO Finish & detail fiberglass models

Simple techniques that will make your model stand out
by Dave Garwood

99 The Best of Model Airplane News' Full-size Plans

HOW TO
146 Repair control surfaces
10 steps to look like new!
by John Reid



CONSTRUCTION

124 The Northrop A-17

A .25-size, between-the-wars attack-bomber
by Frank B. Baker

FLIGHT TESTS

44 HOT BODIES A-7 Corsair

Jet excitement, ready-to-fly convenience!
by Rick Bell

54 GLOBAL Avance

Fly like a pro with this sport-pattern ARF
by Carmen Luciano

62 GREAT PLANES RV-4

Sport-scale aerobatic Sunday flyer
by Jim Onorato

68 HANGAR 9 Alpha Trainer

Complete package for the first-time flyer
by Dave Martin

76 NORTHEAST SAILPLANE PRODUCTS Accord II

Almost-ready-to-fly electric aerobat
by Greg Gimlick

COLUMNS

158 RPM

Solving engine vibration
by Dave Gierke

168 Grassroots

Dawn Patrol over Green Road Sector
by Robert Boulais

210 Final Approach

The Predator's family affair
by Gerry Yarrish

DEPARTMENTS

8 Editorial

10 Airwaves

26 Tips & Tricks

30 Pilot Projects—
2002 Editors' Picks

176 Classifieds

182 Name that Plane

194 RCStore.com

209 Customer Service Info

209 Index of Advertisers

The newest in RC for 2003

As each new year unfolds, manufacturers offer first glimpses of the new model planes and gear they've been developing; see them here first in this issue's 9-page special "Air Scoop" that features 65 hot releases! From a scale, turbine-powered ARF jet to innovations in electric motors and batteries to dozens of backyard flyers, 2003 promises to be a banner year for RC model airplanes. Don't miss our "New for 2003" that starts on page 14 to see what's coming!

FREE PLANS DIRECTORY

Our January issue also features a bonus, photo-illustrated guide to more than 350 all-time favorite *Model Airplane News* plans. With five decades' worth of model designs to choose from, you're certain to find a winter building project here, whether you're looking for a backyard aerobat, a giant-scale warbird, or a ducted-fan hot-rod. If you're looking for an electric park flyer, be sure to check out



our expanded "Backyard Flyers" section. For a complete directory and details of *Model Airplane News* plans, visit the "RC Store" at www.rcstore.com.

220MPH ACTION!

For heart-pounding excitement, it's hard to beat watching high-power, giant-scale racers turn the pylons as they reach speeds of more than 220mph! The action at this year's Unlimited Scale Racing Association's **North**

Coast Challenge in Jefferson, OH, wowed associate editor Rick Bell; check out his story on page 38 for the latest in giant-scale pylon racing.

IN THE WORKSHOP

Have any of the models in your hangar been grounded with minor damage? In a how-to article this month, new West Coast associate editor John Reid tells how you can **repair control surfaces** in 10 easy steps. Dave Garwood has also been busy in the workshop this month, and he shares simple techniques to **finish, detail and weather** sport-scale models. Dave's straightforward methods can turn an ordinary plane into a showstopper with minimal time and effort.

OLYMPICS-STYLE LAUNCH TECHNIQUE

In this issue, Dave also writes about **discus-launch gliders**, which use an Olympics-style launching technique that provides 30-percent-higher launches and far less wear and tear on shoulders, arms and wrists! Check out his article on page 88 to see how this method is leveling the playing field in glider competitions everywhere and how you can get involved. ✈

EDITORIAL

Editor-in-Chief TOM ATWOOD
Executive Editor DEBRA D. SHARP
Senior Technical Editor GERRY YARRISH
Associate Editor RICK BELL
Assistant Editors MATT BOYD, JAIME LAGOR
Editorial Assistant MELISSA JONES

PUBLISHING

Group Publishers LOUIS V. DeFRANCESCO JR.,
YVONNE M. DeFRANCESCO
Associate Publisher SHARON WARNER

COPY

Copy Director LYNN SEWELL
Senior Copyeditor MOLLY Z. O'BRYEN
Copyeditors COREY WEBER, PAIGE L. HAMILTON

ART / DESIGN

Corporate Art Director BETTY K. NERO
Senior Art Director ALAN J. PALERMO
Promotional Art Director LESLIE COSTA
Promo Designer CHRISTOPHER CHU
Associate Art Directors VICTORIA HOWELL,
COREY W. SMITH, MIKE AMADITZ
Senior Photographer WALTER SIDAS
Staff Photographer PETER HALL

ADVERTISING

Director of Advertising SHARON WARNER
Assistant to Director of Advertising/Associate Publisher
SIRI A. WHEELER
Lead/Training Account Executive MONA TASSONE
Senior Account Executive KATHRYN GEARHART
Account Executive ANITA LEO
Junior Account Executives
CINDI VANDEMARK, SHERRY MORGAN, TINA PRINCIPLE
Advertising Coordinator ANN T. WIEBER

CIRCULATION

Circulation Director KATHY RHODES
Circulation Managers CARMINA M. MCGOVERN,
STACEY NELSON

MARKETING

Media Marketing Manager VANESSA LaFERRIERE

PRODUCTION

Senior Digital Production Coordinator
CHRISTINE BACHMANN-CORBIN
Digital Production Coordinator
CHRISTINA MASCHKE-MILEO
Production Associate TOMLINSON S. WHEELER
Production Assistant BOBBI-JO BALDWIN

INTERNET

Director, Electronic Communications GARY KOLESAR
Web Developers LEO FICKS, HOLLY HANSEN
Web Programmer JAIME TORRES

CORPORATE

Chairman of the Board ALDO DeFRANCESCO
President and CEO LOUIS V. DeFRANCESCO JR.
Secretary and Executive Vice President
YVONNE M. DeFRANCESCO
Treasurer and Chief Financial Officer
CAROL SHEPHERD

CONTRIBUTORS

Bob Aberle, Bernard Cawley, Roy L. Clough Jr., Roy Day,
Don Edberg, Dave Garwood, Dave Gierke, Henry Haffke,
Tom Hunt, Michael Lachowski, Andy Lennon, George Leu,
Jim Newman, Vic Olivett, Jim Onorato, Dave Patrick,
Randy Randolph, Jef Raskin, Faye Stilley, John Tanzer,
Craig Trachten, Rich Uravitch, Bob Van Tassel,
Dan Wolanski, Nick Zirolli.

AB
Member Audit Bureau
of Circulations

A
AirAGE
PUBLISHING

MPA
Magazine Publishers
of America

100 East Ridge, Ridgefield, CT 06877-4606 USA

www.modelairplanenews.com

PRINTED IN THE USA



BIG-ENGINE QUESTION

I learned a lot about gas engines from your May 2002 "Gas Engine Guide," and I ended up buying a Zenoah G-23. I have two questions about my new engine. In the "Troubleshooting" section, two add-on velocity stacks for the carb were shown. Who manufactures the silver, two-piece stack with the end cut 45 degrees? I'm interested in it because I find that gas is being siphoned out of the carb during flight, and this makes a mess on the wing that I have to clean up after every flight. The two-piece velocity stack

looks as though it will solve the problem. (I assume I'll have to adjust the needle-valve settings after I install the stack because of the different quantity of air going into the carb.)

My second question is, which companies sell mufflers that will fit a G-23? Thanks for your help and for all the well-written and useful articles. [email]

DAN STRATMAN

Dan, I'm glad you enjoyed the gasoline-engine article. The G-23 is a great little powerhouse, and once you learn how to adjust it, it will give you years of service.

The velocity stack in the photo is available from Zenoah and is distributed by Horizon Hobby. It is specifically designed for the G-23 engine, and you should be able to bolt it right on. Just remove the two screws that hold the carb to the engine block and reinstall them with the stack in place. It isn't usually necessary to adjust your carb after you add a velocity stack, but if you are having to clean up a

lot of fuel after each flight, you might need to lean out the mixture a bit to compensate for the additional fuel flowing into your carb.

Mufflers for the G-23 are available from several sources. Slimlineproducts.com offers several types, including a nice Pitts-style unit for inverted-engine installation. Davis Model Products, (203) 877-1670, also has large-volume mufflers specially designed for large engines. The company's Soundmaster mufflers are very well made, and exhaust adapters are available to custom fit them to your engine. B&B Specialties (bennettbuilt.com) has several muffler styles to choose from, and I know they have one for the G-23. Thanks for reading; I hope this information helps you enjoy your new gasoline engine!

GY

SUKHOI SATISFACTION

I just read Jim Onorato's flight test of the new Hangar 9 Sukhoi SU-31 ARF. I had been thinking about getting this beautiful giant-scale aerobat, but I was waiting for a review before I decided to purchase one. I



The perfect fueling system

- Complete fuel system
- Fast & easy fueling
- Eliminates sticky fueller valve
- Eliminates air & fuel leaks
- Complete seal
- Keeps fuel fresh
- Easy installation
- Precision machined for exacting fit
- Aerodynamic - non-intrusive
- Universal fueller fits plane & fuel supply

This is no simple fuel dot!



Glow fuel bottle system w/pump



Glow fuel can system w/pump



Gas fuel can system w/pump



Precision fit

Precision seal

New cutting edge fueler design...

available at your local hobby store



480.967.5053

Info@slimlineproducts.com

am very comfortable with 1.20ci- to 40cc-size models, so I feel ready to move up to the big time. Jim's flight-performance description clinched it, and my mind is now made up. I do, however, have a couple of questions.

Jim used four servos for aileron control. Is that what the model requires? Couldn't I use one giant-scale servo for each surface instead? Also, he used the twin-cylinder Zenoah GT-80 for power. I have a G-62; will it be powerful enough? Last, Jim used a redundant battery system with his radio; I want to use a fully redundant radio system in mine. Do you have any suggestions?

BILL CONRAN
Southbury, CT

You're right, Bill; Jim's Sukhoi is an impressive model, and I had fun helping him conduct the first test flight. If you feel confident flying 40cc-size aerobatic models, then you should be able to handle this giant; it really is a sweet flyer.

The Hangar 9 Sukhoi is designed for four aileron servos, and with a model of this size, I would not change that configuration. You certainly could redesign the system, but it is best to follow Hangar 9's recommendation to use four servos with a minimum of 60 ounces of torque each. As for using a G-62 engine, the Sukhoi comes with an adapter for the G-62 single-cylinder engine, so yes; you could certainly use that engine. One of the most popular ways to set up a redundant radio system is to install two complete radio systems and divide their use in the model between the left and right sides. One system controls the right aileron, right elevator half and one of the two servos in the closed-loop rudder pull/pull system. The other radio system controls the corresponding left-side controls. The throttle is controlled by one system, and a fail-safe system is usually installed or programmed into a PCM transmitter to retard the throttle in case of a mishap. Each system has its own battery, switch harness and charging jack. It might seem costly to install two complete radio systems, but compared with the cost of losing your airplane because a radio component failed, it's money well spent.

Good luck with your new Sukhoi! GY

NOTICE: GOOD NEWS!

Progress has been made in the attempt to simplify rotary-wing aircraft. First, it was the robust, precise blade hanger, followed by the simple, infinite-control rotor head—much used now with excellent performance. Perhaps best of all is a recently com-

pleted project to produce rotary wings (blades). Would you believe there's a production method that creates exceptional wing-blades in less than half the normal time and without the associated manual labor, using a common assembly method? Model Airplane News has an exceptional website where this procedure can be seen in

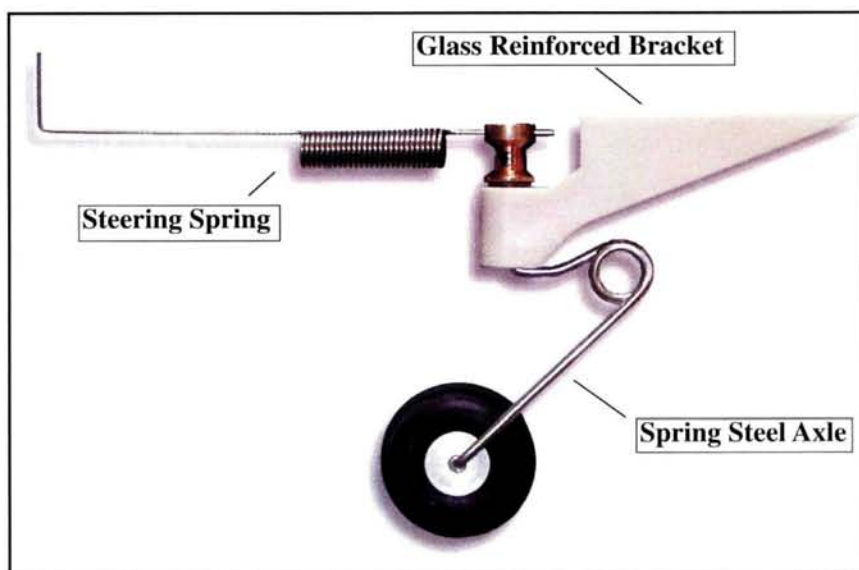
detail. You will find the look very worthwhile!

HAL DEBOLT

Hal, thanks for making this information available for all the autogyro lovers in our audience. We invite everyone to take the "Click Trip" and see what Hal has come up with.

GY ✦

The Simple Tailwheel Bracket.



Want a Steerable Tailwheel bracket that absorbs shocks to the airframe, absorbs shocks to the servo and installs easily with just two screws?

Well, here you are. It can be set up for steering or castoring. It comes with a choice of two steering spring/arms (the bent-up end simply glues into the rudder). No linkages, no control horns, no drag from extra hardware. And the screws are included.

Tailwheel Brackets are available in four weight ranges, covering models from 2 lbs to 35 lbs. The cost is reasonable, too. So use one on your next taildragger and get into the air sooner.

The Sullivan Tailwheel Bracket. Simplicity.

Tailwheel not included. \$859 shown.

Sullivan
PRODUCTS

One North Haven Street, Baltimore,
Maryland 21224 USA.
www.sullivanproducts.com

GETTING BETTER IDEAS OFF THE GROUND



MODELAIRPLANENEWS.COM

NEW FOR 2003

by the Model Airplane News crew

With so many great airplanes and gear to look forward to, 2003 should be one of the best yet for RC! We chose the 65 new releases that we're most excited about and expanded "Air Scoop" to nine pages to bring you the hottest products for the new year. Remember—you saw it here first!



HOUSE OF BALSA

Electric Acro-Cub

This schoolyard-scale, electric model has great looks and performance to match. The laser-cut kit comes with all balsa and plywood parts; instructions photo-illustrated in color; rolled CAD plans; Mylar decals; Du-Bro hardware; and aluminum landing gear. Wingspan—52.5 in.; wing area—350 sq. in.; weight—32 oz.; motor—geared Speed 400 or Astro 010 or 020; radio—4-channel w/three microservos. **Price—\$74.95.**

House of Balsa (760) 246-6462; houseofbalsa.com.

SIG MFG. CO.

Gas Passer

Designed especially for modelers who use gasoline power, this flight box with an electric fuel pump is a build-it-yourself kit that consists of laser-cut, 3/16-inch finishing plywood and all the necessary hardware. It has two drawers with retainers, custom tool holders, a fuel compartment that will hold a gallon can, bottle, or Du-Bro fuel container and a large battery compartment. **Price—\$44.99.**

Sig Mfg. Co. Inc. (641) 623-5154; sigmfg.com.



DYNAMOTIVE

1/4-scale Merlin

What could be cooler than an authentic 1/4-scale replica of a Merlin V-12 engine? How about one that actually runs! Dynamotive offers all of the castings you'll need to build your own working Rolls-Royce Merlin V-12 engine. **Price—\$2,850.**

Dynamotive; dynamotive.netfirms.com/merlin.

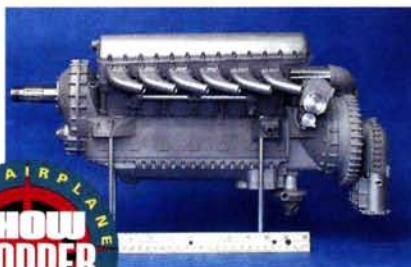


bbi

Elite Force Aviators

Available in a dizzying assortment of scale WW II and modern pilot outfits, these lifelike figures are ideal for dressing up your latest 1/6-scale model. They can be posed to sit in the cockpit, and they come with incredibly detailed scale helmets, goggles, oxygen masks, survival equipment and weapons for added realism. **Prices—\$29.99 to \$49.99.**

bbi; a division of Blue Box Toys (212) 255-8388; blueboxtoys.com.



DU-BRO

Snow Skis, Electro Caddy & Heavy-Duty Hardware

Get ready for winter flying with Du-Bro's park flyer and snowbird snow skis! The park-flyer skis are made of vacuum-formed ABS; the snowbird skis are made of high-density polyethylene. Both have a spring system that ensures easy landings and keeps the skis in a positive position during flight.

Designed especially for the electric flier, Du-Bro's new Electro Caddy holds your transmitter, charger, 12V battery, tools, props and accessories with hook-and-loop fasteners and keeps everything where you put it.



Giant-scale enthusiasts will appreciate Du-Bro's new heavy-duty control-horn system; it has a self-tapping, injection-molded horn, a 2-inch 8-32 socket-head bolt, a heavy-duty clevis and a Swiss-machined aluminum pin with a steel cotter pin for a secure fit. **Prices—\$24.95 (Electro Caddy); \$7.95 (two heavy-duty control horns); \$9.95 to \$22.95 (Snow Skis).**

Du-Bro Products (800) 848-9411; dubro.com.





IKARUS

Piccolo Pro & Fun Piccolo

Whether you're looking for an easy-to-fly heli or a 3D aerobat, Ikarus has you covered with its new Piccolo Pro and Fun versions. The 11.8-ounce Pro features

symmetrical rotor blades, an incorporated free

wheel and a 410 Pro motor. It has a 21.3-inch-diameter main rotor and is 20

inches long. The Fun version is easy to build and control, and it's available in ready-to-fly form and as a kit. It has a main rotor diameter of 19.7 inches, is 19.7 inches long and weighs only 10 ounces. Prices—\$256 (Pro); \$148.50 (Fun ready-to-fly); \$99 (Fun kit).

Ikarus USA (239) 690-0028; ikarus-usa.com.



TOP FLITE

1/5-scale T-34B Mentor

With interlocking I-beam, D-tube wing construction, a balsa-sheathed fuselage and wings, ABS cowl, tail cone and sliding canopy, this kit certainly deserves its "Gold Edition" title. The model can also be built with optional retractable landing gear and flaps, and a fully detailed, scale cockpit is available. Wingspan—80 in.; engine—.60 to .91 2-stroke or .61 to .91 4-stroke. Price—\$219.99.

Top Flite; distributed by Great Planes Model Distributors (800) 682-8948; top-flite.com.

WATTAGE

MiG & Vx400

A companion to WattAge's great-flying F-86 Sabre Jet, this new MiG park flyer has the same molded-foam fuselage and also uses a Speed 400 fan unit for power (included). Wingspan—30 in.; wing area—163 in.; weight—19.4 oz.; radio—3-channel w/elevon mixing.

Expect great performance from this factory-built sailplane! It has a painted, molded-fiberglass fuselage, open framework bolt-on wing, easy access battery hatch and a long motor compartment that will accept a variety of motors and in-line gearboxes. Wingspan—60.75 in.; wing area—425 sq. in.; length—37 in.; weight—26 to 28 oz.; 4-channel radio.

Prices—\$99.99 (MiG); \$99.99 (VX400).

WattAge; distributed by Global Hobby Distributors (800) 854-8471; globalhobby.com.



HOT BODIES

Skywave

Hot Bodies has taken the popular pod-and-boom, pusher-configuration park flyer to another level by adding a conventional tail and a third channel! This model comes with a Speed 380 motor and RC gear installed and can be

ready to fly in minutes. A 7-cell, 600mAh battery, 3-channel transmitter and charger are included. Wingspan—40 in.; length—27 in.; weight—1 lb., 2 oz. Price—\$170. Hot Bodies (909) 296-9440; hotbodiesonline.net.



FLYZONE BY HOBBICO

Park Pilot

The Park Pilot comes completely built and assembled and with everything you'll need to get it into the air, including a direct-drive Speed 280 motor, NiMH flight pack, charger, electronic speed control with auto cutoff and a 3-channel Futaba radio with two microservos. Prices—\$99.99 (ARF); \$239.99 (ready to fly).

FlyZone by Hobbico; distributed by Great Planes (800) 682-8948; hobbico.com.



MODEL MACHINING SERVICE

Inner Driven Gear Drives

These gear drives allow you to use one or two motors and to easily change gear ratios at the field. The Mini Demon weighs 82 grams and is for models that are powered by Speed 370- to 480-size motors; the Inner Demon weighs 231 grams and is for motors such as the MaxCim, Aveox 3600 and Hacker B50. An EZ mount system comes with the Inner Demon and is available as an option with the Mini Demon. Prices—\$109.95 (Inner Demon); \$95 (Mini Demon). Model Machining Service (949) 631-2982; innerdemon.com.



NEW FOR 2003

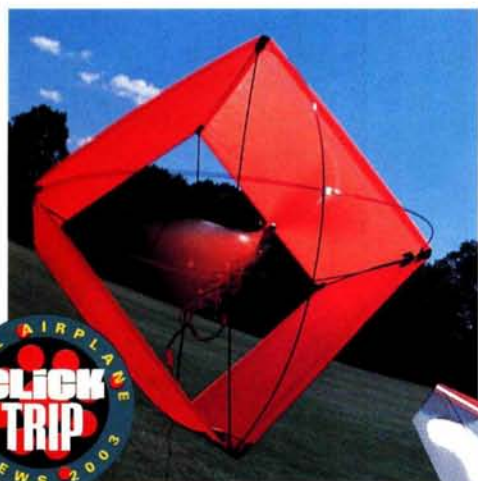


E-FLITE

Ascent

Designed for park flying, this almost-ready-to-fly powered glider comes with a Speed 400 motor and a folding propeller, and it features a fiberglass fuselage and a bolt-on wing. Wingspan—54 in.; length—32 $\frac{3}{8}$ in.; wing area—331 sq. in.; weight—19.5 oz. Price—\$69.99.

E-Flite; distributed by Horizon Hobby Inc. (217) 355-9511; horizonhobby.com.



VOLTAIR

Flying Cube

Now in its production version, this 19x21-inch Cube is an indoor/outdoor slow flyer that turns heads wherever it flies. It's made of Icarex rip-stop polyester fabric with a carbon-fiber frame and cross struts, and it uses a GWS motor geared 7:1 and an 11x4.7 prop for power. Prices—\$219 (RTF without receiver); \$189 (ARF); \$89 (basic kit).

Voltair Technology LLC (530) 273-3855; voltaircube.com.

HOBBYZONE

Aerobird

With proportional 3-channel pitch, direction and throttle control, HobbyZone's Aerobird is destined to be as popular as its Firebird predecessors. This ready-to-fly model comes with a single-stick transmitter, a 6-cell, 900mAh NiMH battery and a portable fast-charger with a car adapter. Wingspan—42 in.; length—31 in.; weight—16.1 oz. Price—\$179.99.

HobbyZone; distributed by Horizon Hobby Inc. (217) 355-9511; horizonhobby.com.



BERG

berg-4 DSP Micro Stamp

Named the "Micro Stamp" because of its diminutive size and weight (only 1.42x0.77x0.280 inches and 7 grams!), this 4-channel, narrowband receiver has a micro-processor decoder that passes only "good" pulses to the servos and an onboard LED signal-quality indicator. It's available on negative shift on all 72MHz frequencies. Price—\$69.99 (w/out crystal).

Berg; distributed by RC-Direct (888) 291-4531; rc-direct.com.



SKYZONE

Sukhoi Su-27

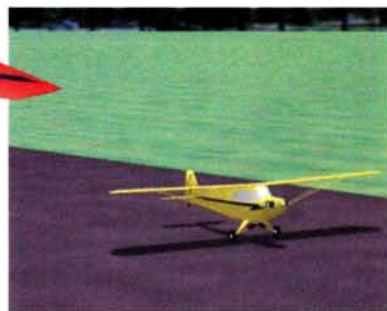
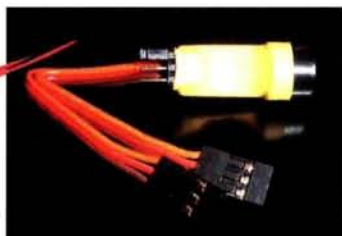
This twin, electric ducted-fan model comes ready to fly with retracts and two motors installed, and it's said to be a hot performer! The prototype has a 53-inch span and uses Hacker B40s motors; the commercially available version will be slightly larger and will use larger ducted-fan units. Price is not yet available.

SkyZone; distributed by Ace Hobby Distributors (949) 833-0088; acehobby.com.

WINDRIDER R.S.B AVIATION

WingMaster

This three-in-one device is an elevon/V-tail mixer, a low-battery indicator and a lost-model alarm. With an operating voltage of 2.7 to 6 and current consumption of only 4.75mA, this 6-gram unit will not only keep your model in the air but will also help you find it if you land off-field! Price—\$25 plus S&H. Windrider R.S.B Aviation Ltd.; windrider.com.hk.



DAVE BROWN PRODUCTS

RCFS2001

Two new libraries of models are now available for the RCFS2001 flight simulator. Library 1 includes 10 popular aerobatic models,

including a Pitts S2B, a CAP 232 and a Zlín Z-50M; Library 2 features 10 park flyers and trainers, including a Crazy Sparrow and a Fly Stick. Prices—\$199.99 (updated flight sim); \$49.95 (update only).

Dave Brown Products (513) 738-1576; dbproducts.com.



ICARE SAILPLANES **Duo-Discus T**

This incredibly scale glider comes with a finished cockpit dressed up with upholstered seats, sliding vent windows and all control sticks and levers. The all-molded, 1/2-scale sailplane also features hollow wings, installed airbrakes and a hinged canopy, and it comes with a self-launch system. Wingspan—141 in.; length—67 in.; wing area—1,040 sq. in.; weight—11.7 lb. **Price—\$1,758.**

ICARE Sailplanes (450) 499-9094; icare-rc.com.



HANGAR 9 **1/4-scale Super Cub**

Scale looks and performance combine in the Hangar 9 model of this adventurous plane. Covered in WorldTex fabric, the model features scale flaps and comes with painted fiberglass wheel pants and cowl. Wingspan—100 in.; length—62.25 in.; wing area—1,294 sq. in.; engine req'd—.61 to 1.48 2-stroke or 1.00 to 1.08 4-stroke. **Price—\$449.99.**

Hangar 9; distributed by Horizon Hobby Inc. (217) 355-9511; horizonhobby.com.



HACKER BRUSHLESS MOTORS **3D Motor**

This 30-cell, brushless motor is so new, it doesn't even have a name, but it won't take long for it to become known in modeling circles. Designed for very large aerobatic models, the motor comes with a 6.7:1 gearbox and pulls 50 amps (1,500 watts) on the recommended 30 cells. It's designed for use with 15- to 20-inch-diameter props. **Price—under \$400.**

Hacker Brushless Motors (480) 726-7519; hackerbrushless.com.



AIRTRONICS **RD8000 & Super Micro ESC**

With 8 channels, 10-model memory and basic-to-advanced menus, the new RD8000 takes the convenience and features of the popular RD6000 to another level. Ever wanted to run each elevator servo on its own channel with independent endpoint adjustment and centering? The RD8000's dual-elevator-channel



feature makes this easy to do. This transmitter is available in standard, sailplane and heli configurations.

Airtronics' new Super Micro speed control packs a lot of features into its 0.15-gram, 1x1/2x1/4-inch package. Designed to operate on 7.2 to 9.6 volts and at 20 amps continuous current (120 amps max), the Super Micro has auto cutoff at 4.8 to 5 volts and BEC circuitry. **Prices—\$459.95 (basic RD8000 system); \$39.95 (Super Micro ESC).**

Airtronics (714) 978-1895; airtronics.net.



ACE HOBBY DISTRIBUTORS **Raptor .30 V2 & eHawk**

The engineers at Ace found a way to make a great heli even better: their new Raptor has all the 3D performance of the original with redesigned side frames, a reinforced pitch-control arm, improved swashplate and a new

look. Main rotor diameter—49 in.; length—45.27 in.; weight—6.6 lb. The new ARF eHawk features an ABS fuselage, sheeted and covered

2-part wing and tail and comes with a 540-size motor and 8x4.5 folding propeller.

Wingspan—80.7 in.; length—38.6

in.; wing area—524 sq. in.; weight—51 to 55 oz. **Prices—\$339.99 (Raptor V2); \$224.99 (eHawk).**

Ace Hobby Distributors (949) 833-0088; acehobby.com.



SUPERKRAFT **Mustang Park Flyers**

Available in four color schemes, these electric ARF flyers are sure to spice up the action at the local park! They're designed for Speed 400 power on a 7-cell, 600mAh pack. Wingspan—33.5 in.; length—24 in.; wing area—210 sq. in.; weight—16 to 18 oz.; radio—3 channels. **Price—\$67.77 each.**

SuperKraft; distributed by Kangke USA (631) 274-3058; kangkeusa.com.



NEW FOR 2003

IRVINE 39 Aero

This high-performance powerplant provides 1.3bhp at 18,000rpm and weighs only 13.5 ounces! Like other Irvine engines, it features a 2-needle carburetor, dual ball bearings and a custom muffler with adjustable exhaust vectoring. It's finished in the classic Irvine style with a metallic red powder coat. **Price—\$205.98.**

Irvine; distributed by Sig Mfg. Co. Inc. (641) 623-5154; sigmfg.com.



NORTHEAST SAILPLANE PRODUCTS Accord 47 & AcroPhat

Ideal for 3D aerobatics, the Accord 47 ARF features D-tube wing construction with a double spar, a battery-access hatch and Solarfilm covering. It comes with landing gear, clear canopy, wheels and all hardware. Wingspan—47 in.; wing area—505 sq. in.; weight—43 oz.; motor—Speed 600, geared Mega 22/30/3 or Kontronik 501; radio—4-channel w/four microserves.



The AcroPhat provides true aerobatic performance in park-flyer style! It comes built and covered with Solarfilm, and its control surfaces are already hinged. A Speed 400 motor geared 4.1:1, an APC prop and prop adapter, wheels, landing gear, clear canopy and hardware are also included. Wingspan—40.5 in.; wing area—360 sq. in.; weight—20 oz.; radio—4-channel w/three sub microserves. **Prices—\$159.95 (Accord 47); \$159.95 (AcroPhat).**

Northeast Sailplane Products (802) 655-7700; nesail.com.

SPORTSMAN AVIATION Sea Monster

Take off from land or sea with this .45- to .60-size, almost-ready-to-fly plane. It features a molded-fiberglass, wood-reinforced hull, molded wingtip pontoons and a thick, symmetrical wing with big ailerons for full aerobatics. Wingspan—62 in.; wing area—775 sq. in.; length—55.5 in.; engine—.46 to .61 2-stroke; weight—7 to 7.75 lb.; radio—4-channel w/four servos. **Price—\$229.95.**

Sportsman Aviation; distributed by Global Hobby Distributors (800) 854-8471; globalhobby.com.



PACIFIC AEROMODEL MFG. INC. 1/4-scale Laser-200

This 3D aerobat features all-wood construction with iron-on film and a plug-in wing, and its fiberglass cowl and wheel pants come painted. Wingspan—70 in.; wing area—827 sq. in.; weight—8.2 to 9.5 lb.; 4-channel radio w/six servos; length—56.7 in.; engine—.60 to 1.08 2-stroke or .90 to 1.20 4-stroke. **Price—\$299.99.**
Pacific Aeromodel Mfg. (800) 780-0100; pacaeromodel.com.



GRAUPNER

Monsun & Gee Bee Sportster

Looking for a one-of-a-kind scale plane? Check out this Monsun ARF; it comes with a tinted canopy with a separate white canopy frame, plastic cowl and wheel pants, features all-wood construction and comes assembled and covered. The model also comes with hardware, landing gear and wheels. Wingspan—36.25 in.; wing area—225 sq. in.; length—29.5 in.; weight—23 oz.; motor—Speed 400; radio—4 channels.

The Golden Age Gee Bee Sportster comes with all-foam parts that are keyed to each other for quick assembly. Pylon races in the park were never easier! Wingspan—39.5 in.; wing area—256 sq. in.; length—26.75 in.; weight—24 oz.; motor—Speed 480; radio—4-channel. **Prices—\$89 (Monsun); \$89 (Sportster).**

Graupner; distributed by Hobby Lobby Intl. (615) 373-1444; hobby-lobby.com.



ZENOAH G-26

Weighing in at 59 ounces—only 2 ounces more than the ever-popular Zenoah G-23!—the new G-26 offers an impressive 8,000rpm with an APC 16x8 propeller. This new powerplant also has nearly the same mounting dimensions as the G-23, too, so it's an easy swap out. **Price—\$229.99.**

Zenoah; distributed by Horizon Hobby Inc. (217) 355-9511; horizonhobby.com.





GRAUPNER Aermacchi MB 339/A

With a white composite fuselage, obechi-skin wing and tail, factory-installed engine and landing-gear mounts, this jet kit should be a very quick build. Wingspan—72.8 in.; length—72.8 in.; weight—18.7 lb.; engine—17-lb.-thrust turbine. **Price—not yet available.**

Graupner Aermacchi; distributed by Modellbau USA (954) 476-5572; modellbau-usa.com.

3 SEA BEES

Yokosuka "Willow" K5Y2

Like the rest of the models in the 3 Sea Bees line, this scale beauty comes built and covered and includes all the necessary hardware; just add an engine, fuel tank and radio! It's available with and without markings and paint. Wingspan—86.6 in.; length—64 in.; weight—15 lb., 5 oz.; engine—90 to 1.20 2-stroke or 1.20 to 1.50 4-stroke. **Price—\$979.** 3 Sea Bees (425) 334-6089; 3seabees.com.



POLK'S HOBBY

Tracker II & Seeker II

Tired of waiting for your frequency pin to fly? Check out the Tracker II—a computer radio that has a built-in scanner and can use all 50 aircraft frequencies! The Tracker II comes with the Seeker II, a synthesized receiver that can be programmed by Tracker II. Added features include 99-model memory, exponential, endpoint adjustment, dual rates, mixing and more. **Price—\$275.**

Polk's Hobby (973) 351-9800; polkshobby.com.

VMAR

Viper & Apache III

Both of these almost-ready-to-fly models are built entirely of wood and feature VMAR's new Polycote enhanced covering system, in which the graphics are actually embedded in the covering. The 33-inch-span Viper Electric (shown) comes with a 440 motor, gearbox and prop; a Viper Glow version is available for .15 power.



VMAR's Apache III ARF Trainer includes hardware for your choice of tricycle or tail-dragger landing gear and comes with pinned hinges, all hardware and a pilot figure. Wingspan—69 in.;

wing area—770 sq. in.; length—46 $\frac{3}{8}$ in.; weight—6.35 to 6.85 lb.; engine—.40 to .53. **Prices—\$64.95 (Viper Glow); \$69.95 (Viper Electric); \$99.95 (Apache III).**

VMAR; distributed by Richmond RC Supply (877) 727-2329; richmondrc.com.



STAR FLIGHT

Pulsar F5J-400

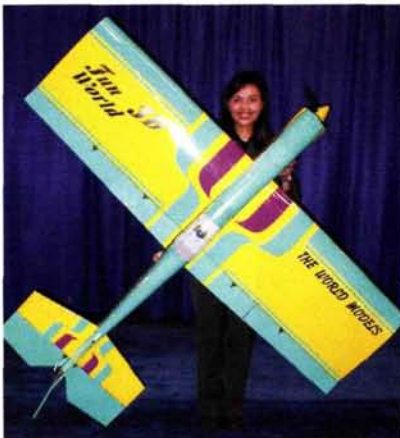
This handmade competition glider has a painted and gelcoated fiberglass fuselage with carbon-fiber reinforcement, a carbon-fiber tail boom, a Kevlar-sheeted D-box design with carbon-fiber-faced balsa wing ribs and a carbon-fiber-strip trailing edge. The elevators, flaps and ailerons come covered and hinged. Wingspan—78.75 in.; wing area—496 sq. in.; weight—12 oz.; motor—Speed 400 or 480; radio—6- to 8-channel w/four micros. **Price—\$399.** Star Flight (416) 424-1607; jutstar.com.



THE WORLD MODELS

Fun World 3D & Spitfire

Want to wow the crowds? How about this 3D machine with its oversize flying surfaces and bright color scheme? This ARF features all-wood construction, a painted cowl and aluminum-alloy landing gear. Wingspan—71.5 in.;



wing area—1,406 sq. in.; length—70.5 in.; weight—9.5 lb.; engine—4-stroke 1.20.

The World Models' new Spitfire ARF is ready to join the Battle of Britain; just add a .60 4-stroke and 6-channel radio with seven servos. Wingspan—63 in.; wing area—704 sq. in.; length—53 in. **Prices—\$249.99 (Fun World 3D); \$274.99 (Spitfire).**

The World Models Mfg.; distributed by Airborne Models (925) 371-0922; airborne-models.com.

NEW FOR 2003



AMERICAN PIONEERS HOBBIES Extra 300S

This fully built and covered model comes with aluminum landing gear, painted cowl and wheel pants and a clear plastic canopy. Wingspan—58.2 in.; length—29 in.; weight—2.8 lb.; engine—.46 2-stroke; radio—4 channels. **Price—\$159.** American Pioneers Hobbies (413) 781-2036; apioneersrc@hotmail.com.



HIROBO SST Eagle Freya X-Spec

A hybrid of the standard and EX versions of the popular Freya, this new heli has improved flight characteristics and reduced weight, and it includes popular option parts such as a machined aluminum

autorotation hub, a metal head block, carbon-fiber fins and tail-control linkages, two gear ratios, push/pull collective control and a plastic servo mount and upper main frame to reduce assembly time and vibration. The Freya X-Spec is a U.S. MRC/Altech exclusive. **Price—\$900.** Hirobo; distributed by MRC/Altech (732) 225-6144; modelrectifier.com.



SUPERKRAFT Rearwin Speedster & Monocoupe

These scale ARF models feature all-wood construction and come with painted fiberglass cowls and wheel pants. Rearwin specs: wingspan—96 in.; length—70 in.; wing area—1,440 sq. in.; weight—12 to 16 lb.; engine—1.8 to 2.4 gas; radio—4-channel w/five servos. Monocoupe specs: wingspan—98 in.; length—68 in.; wing area—1,468 sq. in.; weight—14 to 16 lb.; engine—.91 to 1.80, radio—5-channel w/seven servos. **Price—\$399 each.**

SuperKraft; distributed by Kangke USA (631) 274-3058; kangkeusa.com.



HITEC RCD Neon-SS & Electron 6

This affordable, 3-channel FM radio is packed with features such as mixing, servo-reversing and an external charge jack. Unlike other "starter" radios, however, the Neon-SS can grow

with you as you start to look for more sophisticated options such as dual rates, adjustable travel volume, trainer capability and even a switch for a fourth channel! All of these are available in easy upgrade packages. **Price—\$147.99 to \$179.99** (depending on airborne package included); the upgrades cost from \$7.95 to \$19.95 each.

The Electron 6 is a dual-conversion, 6-channel receiver that weighs just 0.6 ounce (without a crystal) and is less than 2 inches long—perfect for small airplanes! **Price—\$99.99.** Hitec RCD (858) 748-6948; hitecrd.com.



A.J. ENGINEERING Wolf Predator Model B

Looking for an engine for your latest big-bird model? This 1.8ci, rear-inducted reed-valve gas engine provides 3.8 horses at 7,400rpm. It features a Bisson muffler,

balanced crankshaft, machined aluminum parts, C&H Synchro Spark ignition and a Walbro carburetor. **Price—\$569.95.**

A.J. Engineering (920) 893-9675; ajengineering.com.

NEW FOR 2003

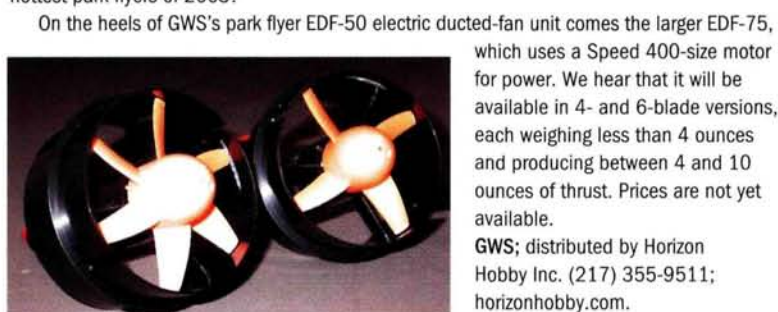


CERMARK MB-339

One of the first turbine ARF jets available, this model features a fiberglass fuselage and a fiberglassed, balsa-sheathed wing. It comes with tip tanks, two scale pilots and instrument panels, and it's also available in white. Wingspan—67 in.; length—64.5 in.; radio—5-channel; weight—15 to 24 lb.; power—12- to 18-lb.-thrust turbine or .90 ducted fan. **Price—\$998.** Cermark (714) 680-5888; cermark.com.

GWS Ducted-Fan News

Rumor has it that this new B-2—powered by two GWS EDF-50 motors—flies incredibly well. Full details are not yet available, but this should be one of the hottest park flyers of 2003!



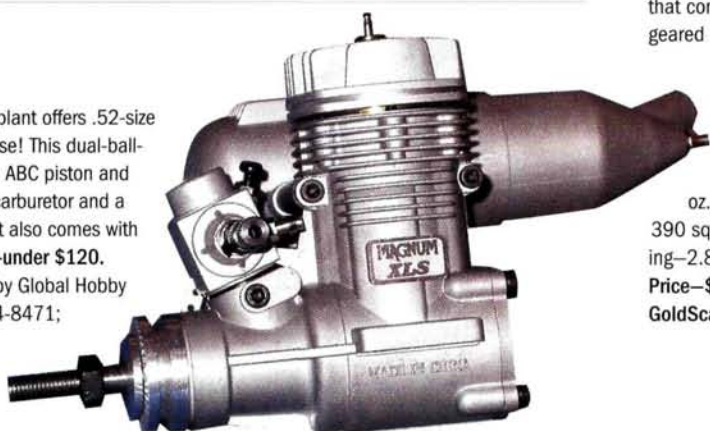
On the heels of GWS's park flyer EDF-50 electric ducted-fan unit comes the larger EDF-75, which uses a Speed 400-size motor for power. We hear that it will be available in 4- and 6-blade versions, each weighing less than 4 ounces and producing between 4 and 10 ounces of thrust. Prices are not yet available.

GWS; distributed by Horizon Hobby Inc. (217) 355-9511; horizonhobby.com.

MAGNUM XLS .52A

Magnum's new powerplant offers .52-size power in a .40-size case! This dual-ball-bearing engine has an ABC piston and cylinder, twin-needle carburetor and a remote needle valve. It also comes with a quiet muffler. **Price—under \$120.**

Magnum; distributed by Global Hobby Distributors (800) 854-8471; globalhobby.com.



GOLDSCALLOP INTL. Q-Butterfly

Looking for some indoor action this winter? Check out the fully aerobatic Q-Butterfly—a precut foam kit that comes with a GWS geared motor, wheels,

hardware and 7x6 propeller.

Wingspan—35 in.;

weight—7.5

oz.; wing area—

390 sq. in.; wing load-

ing—2.8 oz./sq. ft.; radio—3-channel w/two servos.

Price—\$38.74.

GoldScallop Intl. (416) 609-2468; goldscallop.com.



GREAT PLANES

Ultra Sport 40 Plus

This versatile kit is ideal as a second plane or for pilots who are looking for 3D aerobatic performance! It offers three landing-gear options (tricycle, tail-dragger, or optional retracts), interlocking wood parts and an adjustable engine mount. Wingspan—58.5 in.; wing area—595 sq. in.; weight—5.3 to 5.7 lb.; length—46 in.; engine—.40 to .52 2-stroke or .52 to .70 4-stroke; radio—4-channel w/five servos. **Price—\$109.99.**

Great Planes Model Distributors (800) 682-8948; greatplanes.com.



MAXX PRODUCTS Amp Meter

This device is a must-have for every electronics enthusiast! The Maxx Products MX 8100 DC Amp Meter operates on 5 to 28 volts and with a max current of 100 amps, 70 amps continuous. A switch underneath the digital screen changes it to read volts and amps. **Price—\$44.95.**

Maxx Products Inc. (800) 416-6299; maxxprod.com.

NEW FOR 2003



AERO MODEL DESIGN

CyberCopter & Gee Bee

Quite possibly the smallest glow-powered helicopter available, the CyberCopter weighs 19.4 ounces ready to fly, is only 8 inches high and has a rotor diameter of just 23 inches. It's powered by a Thunder Tiger GP 07 engine. Price is not yet available.

Aero Model Design's new Gee Bee ARF has a fiberglass fuselage and a balsa wing, and it comes painted in this classic scheme. Wingspan—71 in.; length—47.2 in.; weight—148 oz.; engine—.90 to 1.20 4-stroke; radio—4-channel w/five servos. Price—\$400.

Aero Model Design; distributed by Excel Hobby (516) 728-2883; excelhobby.com.



FMA DIRECT

Lithium-Polymer Cells & Universal Charger

FMA recently announced that it is the exclusive distributor of Kokam lithium-polymer battery cells in North America, and this is great news for backyard and park fliers everywhere! These new lithium-polymer cells offer longer flights, lower wing



loadings and more power than traditional Ni-Cd and NiMH cells. More good news: FMA is distributing the new MAHA MH-C777 Plus universal charger and analyzer, a peak-detect charger for 1 to 12 Ni-Cd or NiMH cells and up to 4 lithium-polymer or lithium-ion cells. Prices—\$4.95 and up (lithium-polymer cells); \$99.95 (MAHA charger). FMA Direct (800) 343-2934; fmadirect.com.

And your wife says there's no passion left in you.



Radio Control Cars

O Scale Engines



FALCON TRADING

Aerobat

Based on the fuselage of the popular Midwest Aero-Star, this all-wood ARF model can be set up with tricycle or tail-dragger gear, and it comes with hardware and an engine mount for a 2- or 4-stroke engine. Wingspan—60 in.; length—50 in.; weight—5 lb. Price—\$154.99. Falcon Trading Co. Inc. (800) 591-2896; falcon-trading.com.

MIKADO

Logo 10 Electric Heli

With 7- to 12-minute flight times, 3D aerobatics ability and a wide flight envelope, the Logo 10 was designed to please both beginner and expert heli pilots. The heli also features CCPM swashplate mixing, auto hub, blades, thrust bearings and a tooth-belt tail drive. Main rotor—45.25 in.; tail rotor—8.25 in.; weight—4.4 lb.; motor—brushless 600. Price—\$339.99.

Mikado; distributed by RC-Direct (888) 291-4531; rc-direct.com. ✈



HO Train Sets



Slot Cars



Model Rockets



Monster Kits

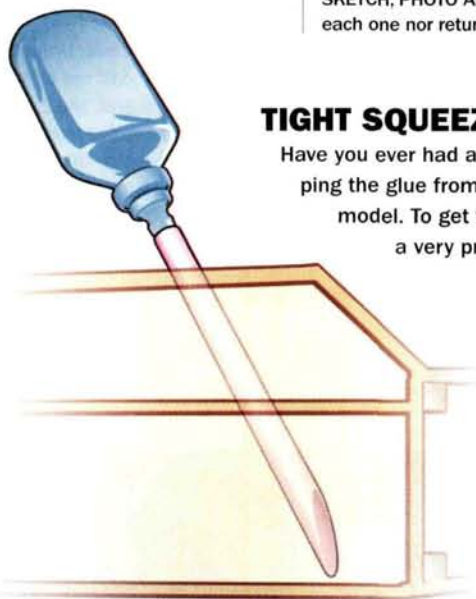


Model Airplanes

Your hobby is our hobby too. For great finds on whatever you're into, check out eBay.com. AOL Keyword: eBay



SEND IN YOUR IDEAS. *Model Airplane News* will give a free, one-year subscription (or one-year renewal, if you already subscribe) for each idea used in "Tips & Tricks." Send a rough sketch to *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can neither acknowledge each one nor return unused material.



TIGHT SQUEEZE

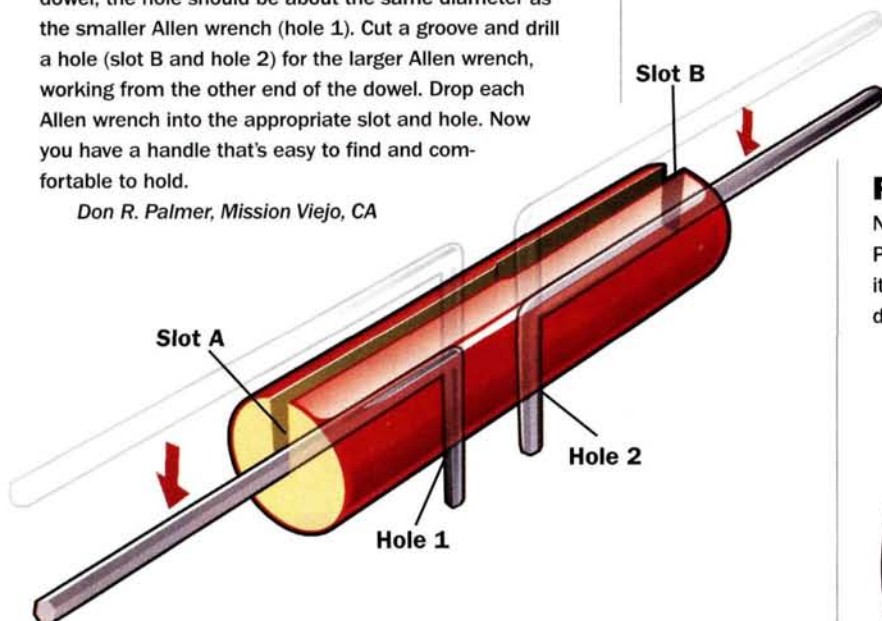
Have you ever had a tight spot that needed glue, but you couldn't fit the CA bottle into it? You can try dropping the glue from a distance, but that's a hit or miss proposition that can leave a big mess on your model. To get the glue where you want it, use a soda straw as an extension tube for the CA bottle. For a very precise application, cut a bevel on the end of the straw.

Joseph Felonk, Willow Springs, IL

DOUBLE-DUTY HANDLE

Are you tired of getting an indentation in your finger and thumb after you use an Allen wrench? Do you have trouble finding the Allen wrench you need in the tool drawer of your flight box? To solve both problems, you can make a holder for the two wrenches you use most frequently out of a thick wooden dowel (an old broom handle works great). Cut the dowel so it's 4 inches long, then cut a 2-inch-long groove from one end of the handle toward the center; the groove should be deep enough to go halfway through the broom handle and be as wide as the smaller Allen wrench (slot A). Next, measure 1.5 inches in from the same end, and drill a hole at the bottom of the groove that goes completely through the dowel; the hole should be about the same diameter as the smaller Allen wrench (hole 1). Cut a groove and drill a hole (slot B and hole 2) for the larger Allen wrench, working from the other end of the dowel. Drop each Allen wrench into the appropriate slot and hole. Now you have a handle that's easy to find and comfortable to hold.

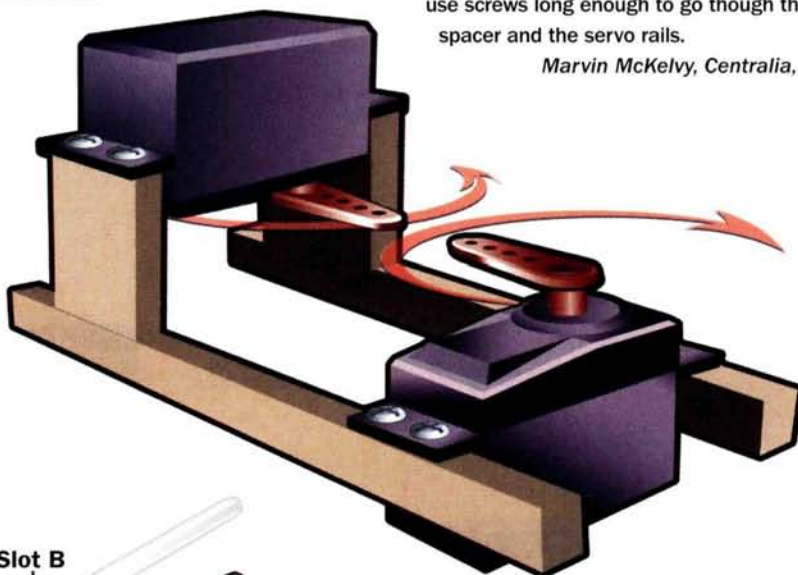
Don R. Palmer, Mission Viejo, CA



MIRRORING SERVOS

Split elevators often require the installation of one servo for each side. To keep the same geometry between sides, the servos must rotate in opposite directions. The problem is that when servos are connected with a Y-harness, they rotate in the same direction. A simple solution is to mount one of the servos inverted. All you need is a spacer block to raise the inverted servo so that the servo arm is at the same level as the other servo. Glue the spacer block to the servo rails, and use screws long enough to go through the spacer and the servo rails.

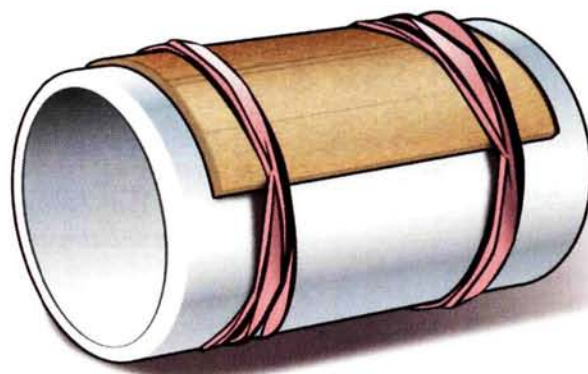
Marvin McKelvy, Centralia, MO

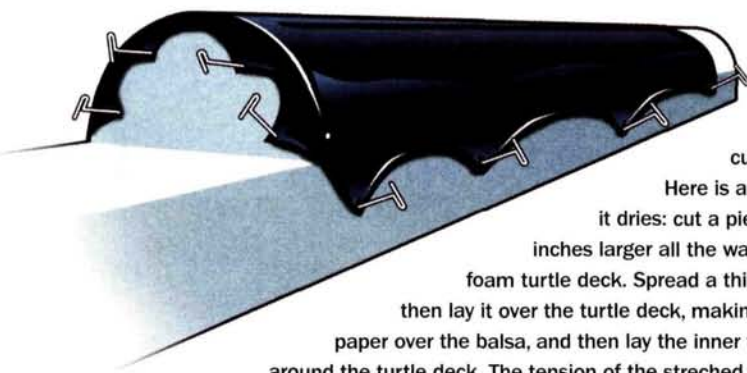


PIPE DREAMS

Need a curved piece of balsa? Try this: buy a 24-inch piece of PVC drainpipe in the diameter that you need. Wet the balsa, lay it over the pipe, and hold it in place with rubber bands until it dries. You may also use this method to mold fiberglass pieces.

Richard McNulty, Norwich, NY





SHEETING A FOAM TURTLE DECK

Sheeting a foam turtle deck can be frustrating, and it requires a lot of T-pins to hold the balsa sheeting down while it is drying. Dampened balsa is easy to mold to the curves of the turtle deck, but tape does not adhere well to it.

Here is a solution that will hold the balsa down firmly on the foam while it dries: cut a piece of a tire inner tube and a piece of wax paper that are 2 inches larger all the way around than the balsa sheet that you want to glue to the foam turtle deck. Spread a thin coat of glue over the inside of the molded balsa sheet, and then lay it over the turtle deck, making sure that all of your joints are flush. Lay the sheet of wax paper over the balsa, and then lay the inner tube over that. Stretch and pin the inner tube all the way around the turtle deck. The tension of the stretched tube will ensure that your sheeting stays put while it dries.

Fabio Nobre Gil, Piracicaba, Brazil

CLIP TIP

For electric RC pilots, keeping track of battery status at the field can be a challenge. It is easy to lose track of which packs have been discharged and which ones are ready to go. To solve this problem, get some wooden clothespins and paint some of them red and some of them green. When you remove the spent battery pack from an airplane, attach a red pin to its lead. When you have recharged the battery pack, remove the red clothespin and replace it with a green clothespin. You will never install a dead battery again.

Gary A. Ritchie, Olympia, WA



THAT'S A WRAP

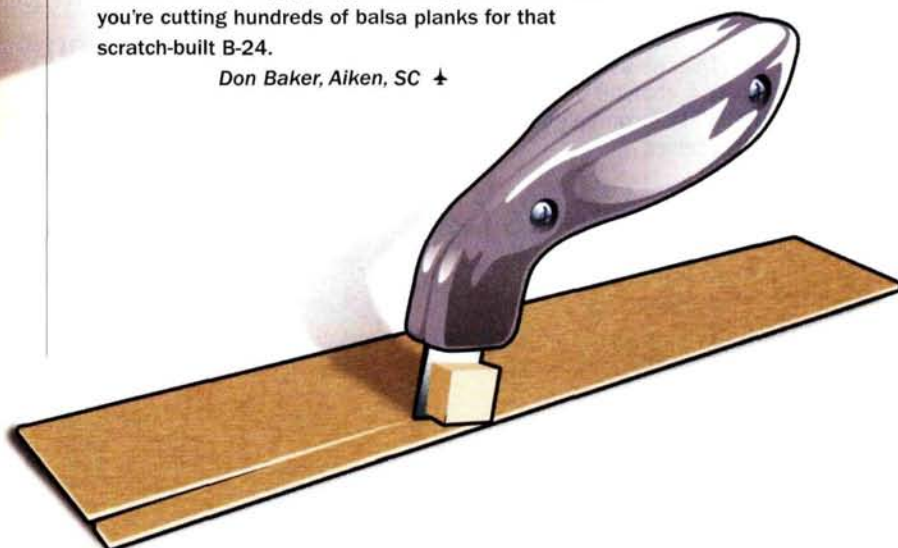
Here is a money-saving trick; when you reseal a can of paint or adhesive, place a piece of plastic food wrap between the lid and can. This will improve the can's seal and prevent it from becoming permanently sealed by paint or adhesive left in the groove. Also, since the plastic food wrap is clear, there isn't any problem identifying the contents of a stored container.

Chuck Maguire, Orono, ME

BALSA-STRIP/CARPET CUTTER

On your next trip to the home improvement center, check out the carpeting department. The offset carpet knife they sell makes a super balsa-strip cutter. You can use it freehand, or you can glue a small hardwood block that's the width of the strip you need to the side of the blade. The offset handle is easy to grip, so you won't get as tired when you're cutting hundreds of balsa planks for that scratch-built B-24.

Don Baker, Aiken, SC ✚



2002 EDITORS' PICKS

SEND IN YOUR SNAPSHOTS. *Model Airplane News* is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable but please do not send digital printouts. We receive so many photographs that we are unable to return them. All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of the year. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in! Send those pictures to "Pilot Projects," *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

GRAND PRIZE WINNER

MIKE MULLIGAN Las Vegas, NV RQ1B PREDATOR

OK, we admit it: we're suckers for originality, and radio control models certainly don't get any more unique than this one of the RQ1B Predator. Built by Mike Mulligan of Las Vegas, NV, his model of the U.S. Air Force's most infamous unmanned aerial vehicle (UAV) first appeared in our August 2002 issue. Mike used 3-views from our March 2002 issue and photos taken at Nellis AFB to design and build this 84-inch-wingspan model of the now famous spy plane. Powered by a .46 Royal engine, the 7-pound, 6-ounce Predator has good flight characteristics, and it looks great in its MonoKote and paint finish. For his incredible imagination and attention to detail, we're proud to name Mike our 2002 "Pilot Projects" grand prize winner. The \$500, a one-year subscription and a *Model Airplane News* T-shirt are yours, Mike. Congratulations!



HONORABLE MENTION



RUPERTO ASIATICO, Virginia Beach, VA, F/A-18

Nothing grabs our attention quite like a model with all the trimmings, and this F/A-18 has more trimmings than a Thanksgiving dinner at the Waltons; it certainly deserves an Honorable Mention. Built by Ruperto Asiatico from a G&P Sales kit, this fighter first appeared in our September 2002 issue. This 10-pound, 55-inch-wingspan pusher jet features a fiberglass fuselage, fully sheeted foam-core detachable wings, Spring Air retracts, functional gear doors and functional air intakes that cool its internally mounted O.S. .91 engine and Mac tuned pipe. The scratch-built cockpit is precisely detailed with full front and side instrument panels, a heads-up display and an ejection seat. Ruperto painted his model with LustreKote and handmade all the markings from vinyl. Now, if that's not worth a copy of "Ultimate RC Flight Guide," a one-year subscription and a *Model Airplane News* T-shirt, we don't know what is. Way to go, Ruperto!

HONORABLE MENTION

GALE SHERMAN, Omaha, NE, OV-10 BRONCO

Finely detailed scale warbirds have a certain appeal of their own, and Gale Sherman's OV-10 Bronco was just too pretty to pass up. It definitely has a certain flair—enough to earn Gale an Honorable Mention. Built from a Rich Uravitch plan published in the February 2001 issue of *Model Airplane News*, Gale's Bronco was shown in our October 2002 issue. It weighs 12 pounds and is powered by two O.S. .46 FX 2-stroke engines. Gale covered the model in Dove Gray MonoKote to replicate the markings of a squadron that was stationed in Bien Thuy, Vietnam, in 1971. It features working flaps, Spring Air retracts and a detailed cockpit with J'Tec instruments. All of his hard work earns him a copy of our newest book "Ultimate RC Flight Guide," a one-year subscription and a *Model Airplane News* T-shirt. Nice job, Gale.





Bob Thacker, San Clemente, CA CURTISS HAWK P-6E

Retired Col. Bob Thacker first glimpsed a Curtiss Hawk P-6E when one landed on a small dirt field in 1934. This all-balsa Curtiss Hawk is covered with Solarfilm and painted with Sig butyrate dope. It's powered by a K&B 65 Sportster, and it spins a 3-blade Master Airscrew 12x6 prop at 11,600 rpm. Bob says that it flies great, but landing it is a challenge.

Lawrence E. Klingberg, Huntington Beach, CA BELLANCA WB-2

Lawrence built this 1/4-scale Bellanca beauty from a Joseph Nieto *Model Airplane News* plan. It has an 11-foot, 6-inch wingspan, weighs 34 pounds and is powered by a Quadra 400. Lawrence used Solartex covering that he painted with Rustoleum spray paint, and he hand-painted all the graphics. He created the detailed radial engine from Williams Bros. cylinders.



Hacker B20 Series Motors

- Ultra-light and Compact Design
- Low Current and High Thrust
- Direct Drive or 4:1 Gearbox
- For Slowflyers, Parkflyers and "400" Models



Hacker B40 Series Motors

- Small, Efficient and Very Powerful
- Up to 70 amps for Competition
- Direct Drive or 4.4:1 Ceramic Bearing Gearbox
- Sport Models to Competition Gliders



Hacker B50 Series Motors

- High-Power and Lightweight
- Up to 100 amps for Competition
- Direct Drive or 6.7:1 Needle Bearing Gearbox
- F5B, Large Gliders and Aerobatic Models

EXCLUSIVE USA DISTRIBUTOR

Hacker Brushless Motors

Hacker Brushless Motors have been specifically developed for Radio Controlled Models. All motors are designed and produced in Southern Germany near Munich (Home of BMW). Every motor embodies precision German technology and manufacturing techniques to create very powerful and efficient motor systems.

Specifications	B20 S Series	B20 L Series	B40 S Series	B40 L Series	B50 S Series	B50 L Series
Max RPM	60,000	60,000	80,000	80,000	80,000	80,000
Motor Weight	1.4 Oz.	2.0 Oz.	4.6 Oz.	5.6 Oz.	7.1 Oz.	8.7 Oz.
Weight+Gearbox	1.8 Oz.	2.4 Oz.	6.5 Oz.	7.5 Oz.	9.0 Oz.	10.6 Oz.
Price Motor Only	\$99.00	\$119.00	\$139.00	\$149.00	\$169.00	\$189.00
Price Motor + Gearbox	\$129.00	\$139.00	\$229.00	\$239.00	\$259.00	\$279.00

Aero-Model, Inc. 2122 W. 5th Place Tempe, AZ 85281

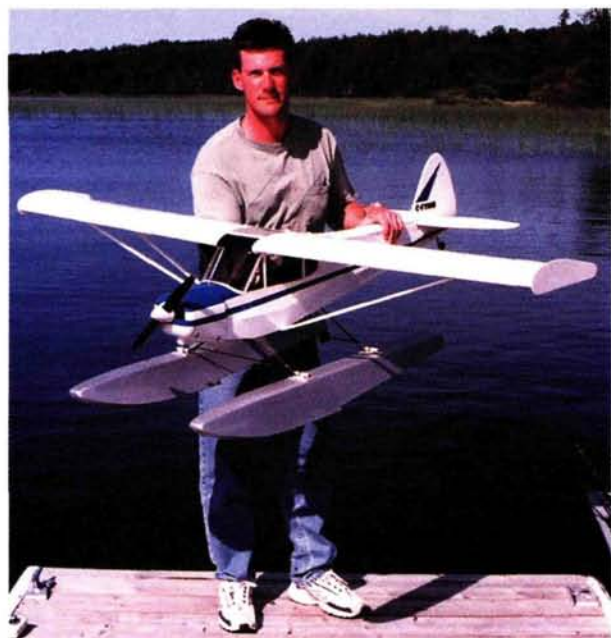
VISA • MASTERCARD • AMERICAN EXPRESS

Phone 480-726-7519

Fax 480-963-5565

www.aero-model.com

aeromodel@qwest.net



Doug Swanson, Elburn, IL
GREAT PLANES PIPER CUB 40

Doug built this model eight years ago as a standard J-3 Cub, but he recently modified it to resemble a full-size Super Cub float-plane from Canada. Modifications include a cowl redesign, floats, clipped wingtips and a new rudder outline. The Super Cub is covered with MonoKote and is powered by an O.S. .48 FS with a Master Airscrew 12x6 prop. The full-size aircraft is used to deliver bait minnows to fishing camps in Ontario. Doug jokes that he hasn't tried to make any deliveries with his Cub yet.

Fran Arrigo, Boca Raton, FL
TOP FLITE GOLD EDITION P-47

When Fran decided to try his hand at a real scale project, he picked a winner. His plane is modeled after the WW II 82nd Fighter Squadron P-47 that was based in Duxford, England. The plane is powered by a Zenoah G62, and it swings a 22x10 prop. Fran covered the P-47 with 3/4-ounce fiberglass and epoxy resin finished with PG Olive Drab over gray paint; even the insignia and markings were painted! Fran detailed the kit with a sliding canopy, a full cockpit, navigation lights, flaps and hatches for the fuel, and air valve and battery switch. Fran reports that the "Jug" is a real crowd-pleaser at shows. ✚



1 / 4 Scale Dr.1 ARF

Save \$100



1 / 4 Scale D7 ARF

Save \$150

Holiday Sale ARFs and Kits

Kits 1/12
to
Full Size



1 / 4 Nieuport 11

Save On Select Kits

ARIZONA

Model Aircrafters
www.arizonamodels.com
 (480) 348-3733 (480) 348-3773_{fax}

Catalogs \$8(US)



Don Moden placed third in AT-6 with his colorful Aerosport AT-6 racer.



Paul Cranston makes final engine adjustments before a Dominator class heat.



GIANT-SCALE RACING AT ITS BEST!

by Rick Bell



Giant-scale racing is a family affair in many aspects; here, Dottie Moden calls for her husband, Don.



Scott Hanbury's gorgeous Aerosport AT-6 is on final approach after a winning heat.



Ken McSpadden painted his Formula One racer pilot to match the plane. Ken took the gold in Formula One.



Terry Williams' sharp-looking Cobra competed in Biplane.



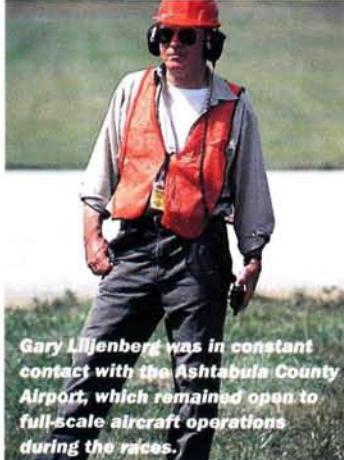
“GENTLEMEN! START YOUR ENGINES!”

was the cry I heard at the Unlimited Scale Racing Association's (USRA) Third Annual North Coast Challenge on the weekend of August 15 to 18. This giant-scale racing event was held at the Ashtabula County Airport in Jefferson, OH. Hosted by the Mentor Area Radio Control Society (MARCS) R/C Club, it was one of the finest races—at one of the greatest facilities—I've ever attended. (Many thanks to airport director Steve Vibbard for his wonderful hospitality.) Contestants came from as far away as Hawaii to race—and race they did! Under the guidance of race director Tony Husak and his hard-working team, heat after heat ran without a hitch.

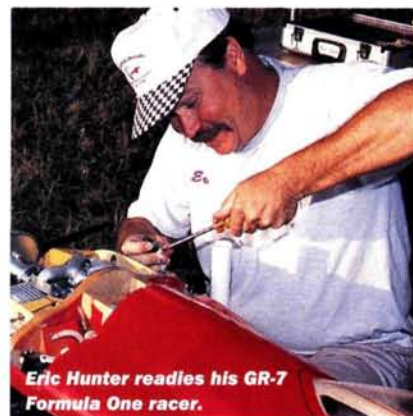
I've been to many races over the years, but this was my first giant-scale event, and it was impressive. From the sound of fire-breathing engines on the tarmac to the extreme speeds of the unlimited and experimental racers, it was truly awesome. I really wasn't prepared for the beauty and sheer size of the models and the skill required of the pilots. Quick thumbs and confidence were as much a requirement as was a reliable engine.



AT-6 was very popular with racers and spectators. Here, Jim Chase sets up his landing after a successful heat.



Gary Liljenberg was in constant contact with the Ashtabula County Airport, which remained open to full-scale aircraft operations during the races.



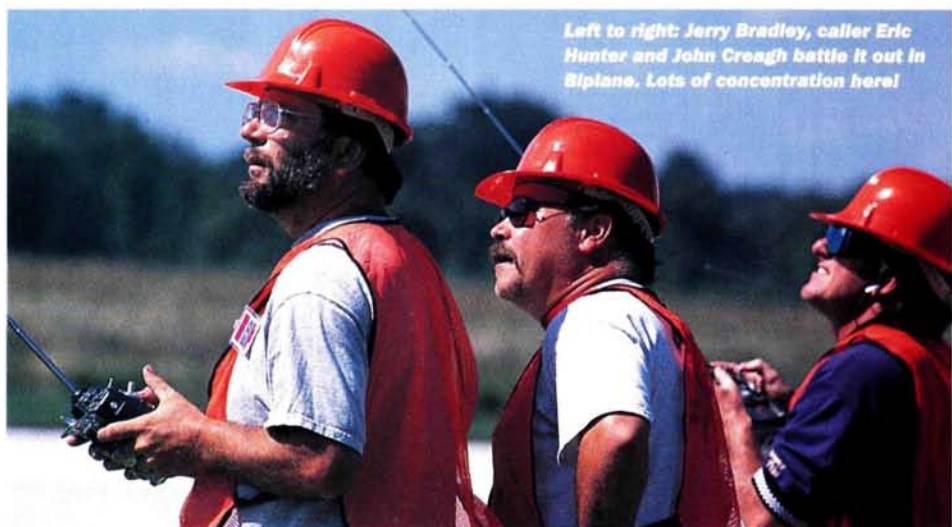
Eric Hunter readies his GR-7 Formula One racer.

EXCITEMENT IS IN THE AIR!

As in past USRA events, several classes were run: Biplane, AT-6, Formula One, Thompson Trophy, Unlimited, Experimental and Dominator. The AT-6 class, in which piloting skill plays the biggest role, really impressed me. All engines must be box-stock Zenoah G-62s, and the event organizers supply the fuel and props to each contestant. Plus, the planes must meet minimum parameters or risk disqualification. The kicker, in the AT-6 class, though, is that the winner of the gold race goes home without his engine. To ensure that the engine is stock, it's removed from the plane after the race and sent to a qualified inspector and torn down for examination. Sure keeps you honest!

To put on a first-class event of this size, you need a first-class contest director and volunteers—a lot of volunteers. Approximately 45 worked at the race and behind the scenes. This is where Tony Husak's experience was so important; it was his third year running the show, and he knew how to keep things moving.

This year, more than 40 pilots flew in the various classes. After a pilot briefing each morning where workers and pilots could bring up any concerns, several heats were flown each day. Safety was heavily emphasized at the briefings, and I'm happy to report that there were no incidents. The racing was exciting with many neck-and-neck heats, especially in



Left to right: Jerry Bradley, caller Eric Hunter and John Creagh battle it out in Biplane. Lots of concentration here!

Tony Husak ran the North Coast Challenge for the third year and did a fine job. From dawn to dusk, he was always there.



SPONSORED BY:

- CLEVELAND NATIONAL AIRSHOW
- AEROSPORT
- AIRTRONICS
- APC PROPELLERS
- BOB SMITH INDUSTRIES
- DU-BRO
- ED RANKIN DESIGNS
- HOBBY TOWN USA OF MENTOR
- HORIZON HOBBY
- KT AVIATION
- LANIER RC
- POWERMASTER FUELS
- ROBART
- TRU-TURN



Gold-winner in Biplane, John Creagh makes a low pass with his Zenoah 445-powered Mong.

AT-6 and Formula One; some were a little too close, as those involved in midairs will tell you. For sheer excitement, Unlimited and Experimental really got the adrenaline going! The speeds of those brutes approached 220mph, and for a few laps, even above! Four-second lap times weren't uncommon. Whew!

LANIER DOMINATOR 1500— USRA PROVISIONAL RACING CLASS

NO DOUBT, GIANT-SCALE RACING can be an expensive sport. But what if you really want to race on a limited budget, or you're just looking for a way to get into giant-scale racing? The USRA knows that the sport can grow only if modelers find an easy way to get involved. So it added a provisional class: Dominator 1500. Intended as an inexpensive, entry-level racing class, it uses the Lanier Dominator 1500 kit as a springboard into giant-scale racing.

To keep things on an even keel, USRA rules govern the class so it doesn't turn into "Who can tweak the plane the most." An IROC approach specifies that all planes must be built to kit specifications:



Lanier Dominator 1500.

this means no changes are allowed to the wing or its airfoil, the fuselage and tail. Only box-stock SuperTigre 3250 and Moki 2.10 engines without tuned pipes are permitted. Servos on all control surfaces must have a minimum of 69.5 ounces of torque, and a 1200mAh flight pack is required.

SPONSORS

Events of this magnitude aren't possible without the generosity of its many sponsors. The purse for the North Coast Challenge was more than \$9,000 in prize money and goodies. Horizon Hobby, Airtronics, Aerosport, Robart, TruTurn, KT Aviation, Ed Rankin Designs and others contributed, and the MARCS thanks them all.

IN THE FUTURE

The USRA is the premier organization for giant-scale racing and has high hopes for its continued growth. The Dominator class is an example of the strides made to bring newcomers into the sport. Other changes are being considered to reduce



SuperTigre 3250.

To further level the playing field, the event host supplies the prop (APC 18x10 or 17x12) and fuel to all the pilots—no chances of anyone gaining an advantage here! Also, the planes must weigh at least 13 pounds, 12 ounces.

The action I saw at the North Coast Challenge showed me that the USRA is on the right track to grow racing; Dominator was one of the more popular classes with many entrants. Racing was tight and exciting with many close finishes, which proves that consistent piloting skill wins races. The class also builds confidence and enables pilots to move into more demanding classes with greater chances of success.

The USRA is heading in the right direction to increase participation in a very exciting sport, and this new class continues to grow briskly. Though it isn't yet an official USRA class, most USRA races have incorporated the Dominator into their programs. It's a great way to get into giant-scale racing.

the cost of participating in this heart-thumping hobby. For more information about giant-scale racing, contact Unlimited Scale Racing Association (USRA), P.O. Box 396, Mentor, OH 44060, or www.usrainfo.org. ✈

Eric Hunter is about to release Jerry Bradley's scratch-build Cauldron. Jerry placed second in Thompson Trophy class.



Fred Sattler's Aerosport Lanceair IV posted speeds of more than 220mph and placed second in Experimental.



RACE-CLASS PARAMETERS

DURING TECHNICAL INSPECTION, each plane is scrutinized to ensure it's built to race-class specifications. Go-no-go gauges measure widths and thicknesses. Planes are weighed, and engines are checked for displacement. Here are the specs for each class.

Biplane

- Scale representation of a biplane on the approved USRA biplane list.
- Minimum wing area: 1,460 sq. in. (both wings combined).
- Minimum weight: 20 lb.
- Maximum engine size: 4.6ci.
- No tuned pipes allowed.
- Engine must be enclosed.
- Speed range: 110 to 150mph.

AT-6

- Scale representation of a two-place North American AT-6 Texan.
- Minimum wing area: 1,500 sq. in.
- Minimum weight: 25 lb.
- Engine: stock Zenoah G-62.
- No tuned pipes allowed.
- Must have pilot and instrument panel in cockpit.
- Event-provided fuel and prop.
- Speed range: 100 to 125mph.

Formula One

- A 42-percent-scale representation of a Formula One aircraft that qualified at the Cleveland National Air Races or the Reno National Air Races.
- Minimum wing area: 1,675 sq. in.
- Minimum weight: 25 lb.
- Maximum engine size: 4.6ci.
- No tuned pipes allowed.
- Must have fixed wheel pants and landing gear.
- Speed range: 110 to 160mph.

Thompson Trophy

- Scale representation of a Thompson Trophy or Golden Age racer that uses a scale-factor method, which combines wingspan and fuselage length.
- Minimum wing/fuselage length is 156 inches.
- Minimum weight: 22 pounds.
- Maximum engine size: 4.6ci.
- Engines must be enclosed.
- No special exhaust system.
- Landing gear must be scale-like.
- Speed range: 90 to 125mph.

Unlimited

- Scale representation of the full-size aircraft that qualified at the Reno National Air Races.
- Minimum wingspan: 100 in.
- Minimum weight: 25 lb.
- Unlimited engine size.
- Landing gear must be scale-like.
- Speed range: 150 to 210mph+.

Experimental

- Scale representation of the full-size aircraft that qualified at the Reno National Air Races.
- Minimum wingspan: 100 in.
- Minimum weight: 25 lb.
- Maximum engine size: 217cc.
- No more than 50 percent of the engine head can be exposed.
- Speed range: 150 to 220mph+.

Dominator

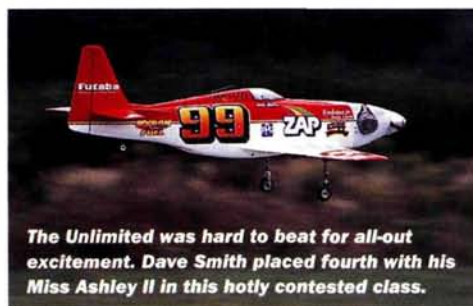
- Stock Lanier Dominator 1500 planes only.
- Minimum weight: 13 lb., 12 oz.
- Engines: only stock SuperTigre 3250 or Moki 2.10.
- No tuned pipes allowed.
- Event-provided propeller and fuel.
- Speed range: 75 to 90mph.



Terry Williams' Cobra cruises in after a close race in Biplane.



Sam Stephens won gold with his Aerosport AT-6. Aerosports dominated the AT-6 class.



The Unlimited was hard to beat for all-out excitement. Dave Smith placed fourth with his Miss Ashley II in this hotly contested class.

north coast challenge gold winners

DOMINATOR

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	69	Stephen Dockery		Dominator 1500	Moki 2.10	JR
2	2	George Knapple		Dominator 1500	Moki 2.10	JR
3	21	Myron Clark	North Coast Aerosport	Dominator 1500	SuperTigre 3250	JR
4	38	Mark Zeal	North Coast Aerosport	Dominator 1500	SuperTigre 3250	Futaba
5	12	Dean Cranston		Dominator 1500	Moki 2.10	JR

BIPLANE

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	39	John Creagh		Mong	Zenoah 445	JR
2	76	Fred Sargent	Old Age & Treachery Racing	Mong	Zenoah 445	Futaba
3	14	Terry Williams	Blue Moon Racing	Sundancer	Zenoah 445	Airtronics
4	74	Peter Goldsmith	North Coast Aerosport	Mong	Zenoah 445	JR
5	44	Tom Keating	PMB Racing	Mong	Zenoah 445	JR

AT-6

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	5	Sam Stephens	Aerosport	AT-6	Zenoah G-62	JR
2	91	Dave Presta	Aerosport	AT-6	Zenoah G-62	JR
3	4	Don Moden	Team JR	AT-6	Zenoah G-62	JR
4	6F1	Paul Towkach	Jo Paul Racing	AT-6	Zenoah G-62	Futaba
5	27	Kevan Avery	Briarpatch Racing	AT-6	Zenoah G-62	JR

THOMPSON TROPHY

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	H-1	Tom Keating	PMB Racing	Hughes H1	Zenoah 445	JR
2	8	Jerry Bradley	Middle Age Crazy	Caudron	Zenoah 445	Futaba
3	55	Ray Thompson	Middle Age Crazy	Brown B2	Zenoah 445	JR

FORMULA ONE

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	19	Ken McSpadden	Quick Turn Racing	GR7	Zenoah 445	JR
2	9	Tom Easterday	Team Extra	Polecat	Zenoah 445	Futaba
3	39	John Creagh		GR7	Zenoah 445	JR
4	23	Eric Hunter	Middle Age Crazy	GR7	Zenoah 445	Futaba
5	12	Jerry Bradley	Middle Age Crazy		Zenoah 445	Futaba

UNLIMITED

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	38	Ken McSpadden	Quick Turn Racing	Miss Ashley II	Herbrandson 290	JR
2	25	Loren Tregellas		NA 50	ZDZ160	JR
3	91	Archie Snider	Aerosport	NA 50	A3 11.4	JR
4	99	Dave Smith	Team Extra	Miss Ashley II	Herbrandson	Futaba

EXPERIMENTAL

PLACE	TAIL NO.	NAME	TEAM	PLANE	ENGINE	RADIO
1	17	Robert Holik	Aerosport	Lanceair 360	A3 8.8	JR
2	47	Fred Sattler	Aerosport	Lanceair IV	A3 8.8	JR

DATA LOGGER ONBOARD DATA RECORDER

NASCAR RACERS DO IT, as do Formula 1 and drag racers; in fact, it's done in just about every form of racing. What is it? The onboard recording of real-time performance data during a race, and the Aerosport EDL-IV Data Logger is the weapon of choice in giant-scale racing. The unit consists of a solid-state onboard data logger that captures information on such important performance parameters as exhaust gas temperature, air-speed, engine rpm and lap time as they happen. It then allows the racer to optimize the mixture settings, propeller selection, engine-cooling requirements and even his "lines" around the racecourse. After a race, the information can be viewed on a hand-held display or downloaded to a laptop computer.

For the unit to work, various sensors must be installed on the model. For rpm, a Hall-effect sensor is mounted on the engine lugs and magnet in the rear of the spinner backplate. To capture engine temperature, a thermocouple is installed in the muffler as close as possible to the exhaust port. And just like full-scale aircraft, a Pitot tube must be installed in the leading edge of the wing. The sensor contains a diaphragm that measures the pressure of the oncoming air.

After one race, I was able to see the Data Logger in action. When the pilot brought his model back to his work area, he plugged the hand-held unit into the plane to capture the information from the onboard recorder. Then he plugged the hand-held unit into a laptop computer and downloaded the data, which was then printed out in graph form: engine rpm and lap time for each lap and engine temperature for the heat that had just been raced. Based on that information, the pilot was able to determine that he had pulled too hard in the turns because the engine rpm had dropped off and then picked up again. Now it was easy for the pilot to adjust the plane's control throws and run a smoother next race.

I was interested to see whether the onboard data would make a difference in the pilot's performance. Before the next heat, the pilot decided to cut back on the elevator throw so turns around the pylons wouldn't be as abrupt. At the end of the heat, the pilot again downloaded the onboard data. When I compared the rpm data of the two heats, much to my surprise, the engine rpm drop-off was less. This proved to me that the pilot had made the correct adjustment to run a faster race.

I can see that in AT-6-class racing, in which all engines, fuel and props are the same, small tweaks can make the difference between winning the gold and watching from the sidelines.





Hot Bodies

A-7 Corsair

by Rick Bell

SLUF—short little ugly fella; that's the name affectionately given to the A-7 Corsair II by its pilots. When the U.S. Navy needed a tactical attack fighter with a range and payload greater than the A-4 Skyhawk's, it approached the Vought Co. to build a suitable aircraft. The first A-7 flew in 1965, and over the years, 1,551 A-7s were produced in nine variants. The A-7 served with the U.S. Navy and Air Force as well as with foreign air forces and navies. Now you can have a neat rendition of this appealing jet in a tidy ARF package.

THE KIT

The ARF market is reaching new heights. Not long ago, if you wanted to get a jet model airborne, you had to spend a lot of money and time. Internal ducting and fuel cells had to be installed, and you often had to work out a host of other problems. Not so with the Hot Bodies A-7!

When you open the box and examine the parts, you'll notice that a lot of work has been done for you. The lightweight, gelcoated fiberglass fuselage comes with the internal ducting, bulkheads, pushrod sleeves, fuel piping and servo tray installed. Alignment slots have been milled in the rear of the fuselage for the vertical fin and stabilizer; this feature makes aligning the tail feathers a snap. The tail surfaces and one-piece wing are built of balsa and covered with a high-quality heat-shrink film. The highlight of the kit, though, is the included power system. It consists of a rear exhaust, pull-start Toki .18-size engine, a ducted-fan unit and a matched tuned pipe. The kit includes everything you need except for the radio system, fuel line and glues. Hot Bodies really did its homework with this ARF!

ASSEMBLY

Before you start to build the model, it's a good idea to study the instruction manual. It's written in Japanese and translated into English. The English translation is a little rough in some places, but the accompanying photos put any questions to rest. An addendum covers changes that were made to the kit after the manual was printed.

Many colorful paint schemes are appropriate for the A-7, and I decided to add some paint before I started assembly. After I did some research on the Internet, I opted for a flat-white bottom and control surfaces with a sky-blue vertical

*Jet excitement,
ready-to-fly convenience!*



PHOTOS BY RICK BELL AND WALTER SIDAS

SPECIFICATIONS

MODEL: A-7 Corsair

MANUFACTURER: Hot Bodies

TYPE: sport-scale, ducted-fan jet

WINGSPAN: 47 in.

WING AREA: 488 sq. in.

WEIGHT: 4 lb., 1 oz.

WING LOADING: 19.1 oz./sq. ft.

ENGINE: Toki .18 glow w/tuned pipe (included)

RADIO REQ'D: 4-channel w/5 miniservos

RADIO USED: JR 8103 and R600 receiver; two JR DS368 micro digital servos (aileron); one JR DS3421 mini digital servo (elevator); two Hobbico CS-35 miniservos (throttle, rudder)

PROP USED: 3¾-in.-diameter fan (included)

FUEL: Wildcat 45% nitro

PRICE: \$499.99

FEATURES: gelcoated fiberglass fuselage with internal ducting; balsa-built wing and tail feathers covered with heat-shrink plastic film; .18 glow engine, ducted-fan unit and tuned pipe; photo-illustrated instruction manual; hardware; pushrods; aluminum landing gear; wheels and decals.

COMMENTS: the Hot Bodies A-7 Corsair is a sharp-looking, quick-to-build, sport-scale ducted-fan jet. The fiberglass and balsa construction is topnotch, and the included power system is easy to install and fits like a glove. Assembly goes quickly, and the clear photos in the manual help to clarify any points not covered in the text. With very little effort, you can turn the Corsair into a real showpiece that stands out in a crowd.

HITS

- Quick assembly.
- High-quality construction.
- Power system included.
- Looks great!

MISSES

- Awkwardly translated instructions.



Above: the A-7 Corsair is a complete package; it's well engineered, and the model can be built quickly. Right: the included power system works well in the Corsair. The Toki engine performs flawlessly.



fin. After I scuffed and masked the areas to be painted, I sprayed them with Top Flite LustreKote. When the paint had dried, I put the wing and tail feathers on the fuselage, and I wasn't quite prepared for what I saw. The transformation of the Corsair was simply amazing!

Fuselage. There isn't much to assemble here; only the landing gear, tail feathers and power system need to be installed. To provide a stable platform from which to work, the landing gear is attached first. The nose gear is inserted from the bottom of the fuselage and held in place with two wheel collars. The main gear is simply screwed to a hardwood block that's inside the fuselage.

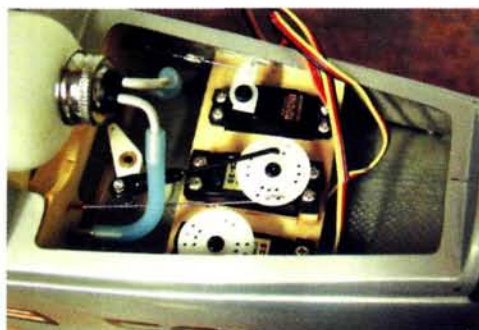
To prevent the model from rolling around on my workbench, I locked the wheels in place. Just remember to loosen them when the model is completed.

I hinged the elevators and rudder to the flying surfaces using the provided CA hinges. The vertical fin and stabilizer halves each have a tongue, and when they are inserted into the fuselage, they mate with each other inside the exhaust outlet to create a solid gluing surface. Be sure to use a slow-setting epoxy for this critical area. I also coated the bare balsa inside the outlet with epoxy to fuelproof it.



These inlet ducts are placed just in front of the ducted fan to increase airflow to the fan. The fuel line is the feed to the carburetor, and the needle-valve extension is just below it.

Right: the servo tray, piping for the fuel system and tank mount are installed at the factory. I had to slightly enlarge the servo cutouts for my miniservos.



The radio installation is compact, and I needed to raise the rudder servo to clear the inlet duct. The receiver and battery slide into the nose so that no additional weight is needed to balance the model. Note the ball link for the nosewheel steering.

Power system. The engine and fan unit are now assembled and installed in the fuselage. I felt it would be a good idea to first run the engine on a test stand to break it in and set the needles.

This also provides an opportunity to adjust the length of the tuned pipe for maximum performance. The manual states that the length of the pipe should be 30mm from the end of the pipe body to the exhaust flange of the engine. I knew this length was incorrect, so I checked the addendum and learned the correct length should

FLIGHT PERFORMANCE



TAKEOFF AND LANDING

The A-7 Corsair requires a hard surface such as a paved runway for takeoff. Because I fly all of my models from grass runways, I decided to bungee-launch my Corsair with the help of a buddy. I installed a Graupner Universal Glider Towhook just in front of the nose gear. It's simply screwed into a backing plate through the bottom of the fuselage. For the bungee, I used 16 feet of 1/4-inch-diameter surgical tubing that I had hanging around. To get the best engine performance, I used Wildcat 45-percent nitro fuel.

Before I started the engine, I stretched the bungee 20 paces and staked it to the ground. Once the engine was running, my helper held the model while I attached the tow ring. On my command, he released the Corsair, and in a few seconds, it was up and away! This bungee-launch was quite easy, and the Corsair handled it very well; every launch went off without a hitch. I left the landing gear on for the first few flights, and I didn't encounter any problems. I also launched the model without the landing gear attached, and launches were just as easy; just keep the wing level.

Although landings on the wheels or belly are easy to do, I prefer to land the model with the gear attached. That big air inlet on the nose makes a great scoop, and it easily picks up and ingests anything in its path. If you fly without the landing gear, I recommend that you shut the engine off before you touch down. The sink rate is very predictable, and when the model is in ground effect, landings can be stretched for scale-like main-gear touchdowns.

LOW-SPEED PERFORMANCE

Even though it's a jet, the A-7's slow-speed performance is impressive. The high wing with its flat-bottom airfoil provides a lot of lift. Stalls are gentle, and it doesn't have any tendency to snap.

HIGH-SPEED PERFORMANCE

Make no mistake about it; the Corsair is no speed demon, but it does groove very nicely. Its flying stance and presence are very believable. The recommended control throws are very good without being twitchy.

AEROBATICS

The Corsair has limited aerobatics capabilities. It rolls quite nicely, and low-level, high-speed passes on the deck look awesome. Loops require a shallow dive to build up some speed. If you enter too slowly, the plane will fall out of the maneuver at the top. All in all, the Hot Bodies A-7 Corsair is a fine model.

be 350mm. I was going to use the propeller for the run-in but decided instead to use the fan that was going to be installed in the model. After I balanced the fan (be sure to do this; it runs at very high rpm), I mounted the engine to my test stand and ran several tanks through the engine. Its performance was very impressive from the beginning, and it was easy to start.

When the engine was broken in, it was time to install the power system in the fuselage. I first added the extended throttle arm

to the carburetor, making sure it was 35mm from the carburetor. I next mounted the engine to the shroud with the supplied metric screws. There are brass inserts in the shroud for the screws to thread into, so take care not to overtighten them, or you'll risk stripping them. The instructions tell you to drill additional holes in the shroud's mounting flange for a cover that totally encloses the engine unit; I felt it would be easier to install the cover first and then drill the holes. Next, I installed the fan onto the

engine and attached the spinner. When you tighten the fan nut, be careful not to break off a fan blade; it will ruin your whole day!

I installed the engine unit in the fuselage and secured it with six wood screws. To prevent the screws from loosening, I removed the unit and put a few drops of thin CA into the screw holes.

The most challenging part of the engine installation is attaching the tuned pipe. You need to secure it to the exhaust port and then screw a pinch clamp to the bottom of the fuselage near the rear of the pipe. The clamp must be lined up exactly with the holes in the fuselage for the screws. I had to install and remove the pipe several times to properly position the clamp. Despite this minor problem, the power system fit nicely in the fuselage. Even the hole for the needle-valve extension lined up perfectly. I then drilled the holes in the shroud for the duct cover and screwed it into place. I assembled the fuel tank and installed it on a shelf that's just behind the cockpit, and then I hooked up the fuel lines.

Wing assembly. The wing needs very little assembly, and it goes quickly. Following the instructions, I hinged the ailerons, added the control horns, mounted the servos to the plastic hatches and installed the aileron pushrods. Before I glued the hardwood servo mounts onto the hatches, I roughed up the plastic to give the epoxy a better grip. I needed to use a 6-inch extension on each servo. I now mounted the wing on the fuselage, secured the wing cover to the wing and glued the dorsal fin to it. Make sure that the dorsal is straight and that it lines up with the vertical fin.

Radio installation. The radio equipment is installed in the cockpit, and although the area looks small, everything fits easily. I did have to enlarge the holes for the miniservos in the servo tray to make them fit, and I had to shim the rudder servo so its bottom would clear the intake duct. The instructions mention that you might have to do this. When I hooked up the pushrods for the rudder and elevators, I reversed the assembly process. The instructions tell you to solder on threaded couplers, slide the pushrods in from the back of the model and make Z-bends to attach them to the servo arms. I don't know about you, but I have difficulty making Z-bends exactly where I want them. I instead made the Z-bend first, attached it to the servo wheel, slid the pushrod into the appropriate sleeve and then cut the pushrod to the correct length and soldered on the coupler.

Easy To Fly RTF Values!

**40" WS
18 oz**

T-HAWK 3Ch RTF
Elevator, rudder, on/off throttle
380 motor, receiver, ESC & 2 servos
Two 8.4V NiCd packs w/AC Charger
Spare wing set & props
\$129.95 w/Transmitter*

Crash Tolerant!

**Buy both and save \$10
if you order one w/o
a transmitter.**

E-GULL 2Ch RTF Parkflyer
Throttle speed, Vtail ailerons
180 motor, receiver, ESC & servo
Two 6.0V battery packs w/AC charger
Spare wing set & props
\$89.95 w/NiCds & Transmitter*
\$99.95 w/NIMH Upgrade

**30" WS
8 oz**

Crash Tolerant!

***Transmitter can
operate either plane!**

Toyronix
Ready-to-Fly-Fun!
Fast Shipping!

www.ReadyToFlyFun.com
Toll Free 1-866-472-8697

HOT BODIES A-7 CORSAIR



The aileron servos are mounted on a plastic hatch. I scuffed the hatch before I glued on the hardwood mounts.

I also deviated from the instructions when I installed the pushrod for the nose-wheel steering. The kit supplies a wire rod that you must bend to shape by putting a Z-bend on each end. I found it much easier to use a Z-bend on the servo end and a ball link on the other end. I wrapped the receiver and battery pack in foam rubber, slid them into the nose cavity and installed the receiver switch.

Final touches. The cockpit was just begging for a little detail, so I made a false floor that enabled me to add a pilot figure. I used thick CA to glue the pilot to the floor, and I screwed the floor to the flange that surrounds the cockpit. When I balanced the jet, I was very pleased to see that it was slightly nose-heavy. This was a good thing, considering that the engine and tuned pipe are aft of the center of gravity. I set up the control throws and added the decals. For the final touch, I added some rub-on stencils that I had lying around. The A-7 Corsair was ready for its first mission!

SUMMARY

The Hot Bodies A-7 Corsair is an exciting, well-engineered model. Despite its complexity, it's as easy to build as any ARF model. With the exception of the paintwork, I was able to build it over a single weekend. The quality of the workmanship and parts is excellent. This is not a model for beginners, and Hot Bodies tells you that up front. It flies well, and it never fails to draw attention on the flightline. ✈

Graupner; distributed by Hobby Lobby (615) 373-1444; hobby-lobby.com.
Great Planes Model Distributors Co. (800) 682-8948; greatplanes.com.
Hobbico; distributed by Great Planes Model Distributors Co.; hobbico.com.
Hot Bodies (909) 296-9669; hotbodiesonline.net.
JR; distributed by Horizon Hobby Inc. (800) 338-4639; horizonhobby.com.
Top Flite; distributed by Great Planes; top-flite.com.
Wildcat Fuels (888) 815-7575; wildcatfuel.com.

POWERMASTER
WORLD FAMOUS MODEL ENGINE FUEL
NOW IN METAL CONTAINERS
FOR SAFETY

POWERMASTER HOBBY PRODUCTS, INC.
P.O. BOX 650, Elgin, Texas, 78621
Ph: 1-800-847-9086 Fax: 1-800-847-9087
E-Mail: inquire@powermasterfuels.com
Website: www.powermasterfuels.com

Combo includes

EUROTECH 50V1

PIPE AND MANIFOLD

ARF KIT

Wingspan..... 23.45"
Length..... 42.1"
Weight..... 3.86 lbs.
Servos..... 3 Standard
Engine..... 40 - 50 2 Stroke
Wood and fiberglass fuselage
Balsa covered foam wing

200 mph!!!

Combo just for \$315
S&H Included

Modellbau USA

741 Shotgun Road, Sunrise FL 33326
Tel: 954 476 5572 Cel: 954 890 5572

Global **Avance**

Fly like a pro with this sport-pattern ARF





by Carmen Luciano

The Global Avance is a .46-size ARF designed for pattern-style aerobatics, but with a few minor changes in servo selection and wiring, it can also be set up as a sport plane. It's constructed of high-quality balsa and plywood and covered with iron-on film. It is built light and straight, which is what a pattern plane demands for precise, predetermined maneuvers. The model is complete right down to the propeller and the clear cowl template that makes installing the fiberglass cowl foolproof. The included custom mechanical retracts are a nice touch.

The 46-page instruction manual is well thought out and easy to follow with many photos and highlighted assembly points, and each section is prefaced by a list of the kit items required and the tools and supplies needed for assembly. The manual's last five pages contain everything you've ever wanted to know about trims, aerobatics versus sport setup, throttle and control-surface management, exponential and even a troubleshooting guide for trim problems.

I only added a .46 Magnum XLS engine, silicone fuel tubing, glue and the RC system. Construction of this low-cost ARF is relatively simple.

ASSEMBLY

- **Wing and belly pan.** The wing halves are joined with the dihedral brace and epoxy. The alignment was perfect out of the box (no sanding or trimming!). I reinforced the wing-root top and bottom with fiberglass, as the wing will have to endure high-G forces during maneuvers. Wing mounting was easy; the doubler is predrilled and accurately aligned. I added plastic retaining clips to the mounting screws to prevent them from falling out into the fiberglass belly pan, which I then epoxied to the bottom of the wing. Make sure that you cut the wing covering just inside the outline of the belly pan so that none of the balsa is exposed.

- **Tail feathers and hinging.** The hinge slots are already cut, so it's easy to install the hinges. Remember to put petroleum jelly on the center of the hinge to prevent glue from sticking to it and making it bind. I used epoxy instead of CA here—just my preference.

- **Fuselage.** The tailwheel assembly has a coiled spring, a nylon bracket and a tiller arm. For accurate alignment, I used wooden rails and clamps to center it

SPECIFICATIONS

MODEL: Avance

MANUFACTURER: Global Hobby

TYPE: pattern-style ARF

WINGSPAN: 57 in.

WING AREA: 600 sq. in.

LENGTH: 55.5 in.

WEIGHT: 5.5 lb.

WING LOADING: 21 oz./sq. ft.

ENGINE REQ'D: .46 2-stroke or .61 4-stroke

ENGINE USED: .46 Magnum XLS

RADIO REQ'D: 5- or 6-channel with 6 servos (rudder, elevator, throttle, ailerons, retracts)

RADIO USED: JR XF622 w/3, 507 JR standard servos, 1 low-profile retract servo and 2, JR 517 servos on ailerons

PROP: 11x6 (included)

FUEL USED: 15% Cool Power

STREET PRICE: \$189.99

FEATURES: all-wood construction with iron-on heat-shrink covering; comes with all hardware, including pull/pull cables; installed mechanical retracts; clear cowl template; clear molded canopy; spinner; fuel tank and filler; engine mount; prop; illustrated manual.

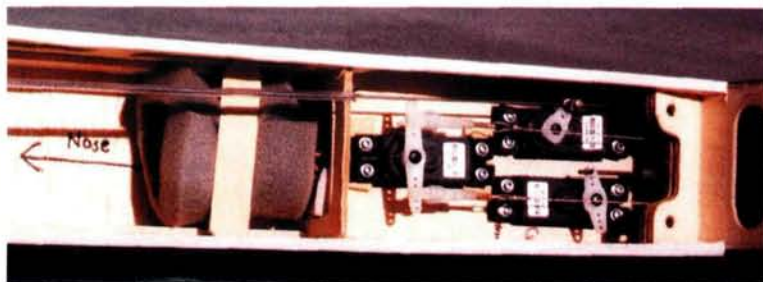
COMMENTS: the Avance is a unique, well-constructed ARF with tight glue joints and an almost flawless iron-on film with highly visible colorful graphics to make flight orientation easy. It's ideal for those who are looking for a light, straight and true, quick from-the-workbench-to-field aerobat.

HITS

- Easy to assemble; little carving and adjusting needed.
- Hinge slots are factory-cut.
- Clear cowl template included.
- Factory-installed retracts.

MISSES

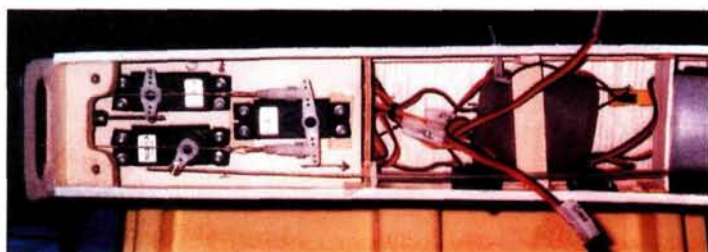
- Engine-mounting and servo-retract instructions could be more detailed.



Left: servos installed aft of the fuselage former. **Below:** radio, servos, fuel tank installed; battery in fuel-tank compartment. I installed the servos aft of the fuse former.

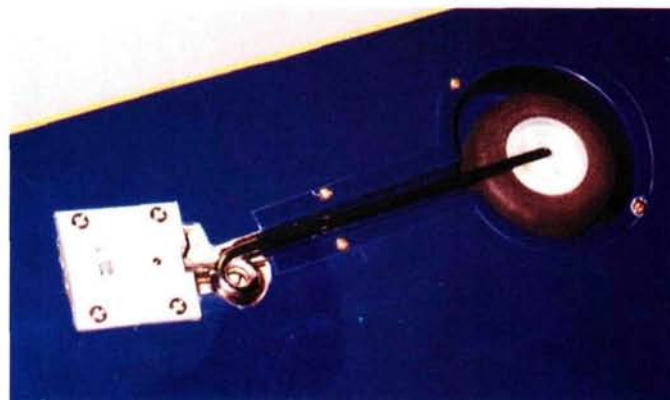
on the rudder and fuselage. The engine is mounted on two separate composite beams. With a little patience, it's easy to properly orient the parts and attach the thrust plate and beams. Just remember that "right" and "left" are as if you are looking at the front of the plane. Three machine screws go into the preinstalled blind nuts in the firewall, and a fourth wood screw secures the right lower beam (don't forget to drill the firewall for this wood screw!). I used a Magnum .46 XLS engine. I find that my Great Planes Dead Center Tool accurately pre-taps the hole locations for the engine mount.

The instructions and photos weren't specific as to where to position the servo tray in the fuselage, so after a light sanding, I epoxied it into place just aft of the



elevator and ailerons. The only problem here was the split elevator pushrod; inserting it into the fuselage was aggravating because of the fuselage formers and the angle I needed to insert it at. I highly recommend that you install the split elevator pushrod before you install the servo tray; it will make assembly a lot more enjoyable. I adjusted the throws for each control surface to the specifications in the instruction manual.

• **Retracts.** If you've never installed and aligned mechanical retracts, this may take a little longer to figure out, as it did for me. I mounted a low-profile, JR BB retract servo with an output torque of 90.8 oz.-in. in position on top of the wing. The retracts come factory-installed on the wing rails, but to hook them up, you need to remove them first. Because the opening in the wing was perpendicular to the wing root (instead of parallel as in the photos in the manual), I



Wheel liner is held in place with wood screws.

had to hollow out the opening to make room for the servo tray. Because of this, I decided to reinforce this area with fiberglass. This wasn't a big problem; it just extended assembly time and complexity.

Rather than glue the wheel liners into the wing, I used small wood screws with 1/8-inch-ply reinforcing blocks under the wing balsa sheeting. Access to the landing-gear bays will be easier if you have to remove or repair the gear in the future. The retracts worked and cycled just fine.

• **Pushrods and cables.** The next step is to install the pushrods for the throttle,



Dihedral brace and dowel at trailing edge for alignment. Note exit holes with string attached to wooden blocks for aileron-servo wires.

FLIGHT PERFORMANCE

Because of the Avance's small wheels with retracts, I couldn't fly off grass; the retracts couldn't take the abuse of my club's grass field, and the drag caused the pushrods to become misaligned. I plan to add larger wheels and to reinforce the pushrod attachment. If you fly the Avance stock, a paved runway is the way to go. Cut the rudder throw down to 75 percent of the suggested throws for gentler ground handling.

TAKEOFF AND LANDING

Throttle up, and the tail lifted up; a slight rudder input compensated for any crosswind, and the Avance rotated gently and smoothly climbed to safe altitude for its initial trim check. Not one click of the trim levers was needed. The plane flew level and true and went where I pointed it—all this with $\frac{1}{2}$ throttle; I was impressed! Landing was a little more difficult, as the plane comes in hot. I corrected for most of this on subsequent flights by adjusting the engine idle.

LOW-SPEED PERFORMANCE

Stall speed was quite low; in fact, I hesitated to lower the idle trim further for fear of engine stall. A gentle nose-down was all I could

see for a wing stall. Recovery with added power and a little up-elevator leveled the plane. All control surfaces responded precisely; this allows predictable pattern maneuvers. The plane was very stable at slow speeds.

HIGH-SPEED PERFORMANCE

I didn't need to make any trim corrections at full power. The .46 Magnum pulled this light aircraft effortlessly through the patterns I flew that morning. The plane is fast, but mid-throttle is all that is needed for this entry-level pattern plane. I definitely recommend that you stick with the low rates for your first few flights; heavy-handed stick input will over-fly this bird.

AEROBATICS

Now, this is what makes the Avance shine. Loops and rolls stayed on line through the pattern. Inverted flight required little, if any, down-stick. Vertical

climbs with rudder input were on line. At the top, a stall turn brings the plane back down with hardly any tail oscillation. This plane really made me look like an advanced pattern pilot; guess what, I'm not! For the first time, I could fly predictable precision maneuvers.



Above: clear-plastic cowl template; red marker outlines engine cutouts. Right: cowl is attached.

FINAL ASSEMBLY

I assembled the included three-line fuel tank with colored tubing to avoid mixing up the carburetor, vent and fuel-filler lines, then I installed it in the fuselage. The cowl alignment and installation was very easy compared with my past experiences. Why? Because Global provides a clear, two-piece molded template for trial cutouts for the engine and muffler parts.

Adding the provided fuel filler, wing skids, decals, spinner and prop completed the project. I achieved the correct CG ($5\frac{1}{4}$ inches behind the leading edge), by placing a 700mAh, 4-cell battery in the fuel-tank compartment (suggested in the manual!). The plane balanced perfectly with this battery location. I also laterally balanced the model for better tracking in flight.



Actual assembly lasted about 21 hours, but I took my time. After breaking in the engine, it was time for the first flight.

FINAL THOUGHTS

The Global Avance ARF is a perfect first pattern plane—especially for aspiring pattern pilots and intermediate sport fliers who don't want to spend hours building a kit! You can't beat the price, and assembly is simple and straightforward with an easy-to-read manual. This plane has predictable aerobatics response and is a pleasure to fly without too many abdominal butterflies. The club members present for the Avance's first flight at our field commented on the model's stability and were surprised at how well I pushed it through its patterns (I still wonder whether they were complimenting my flying skills or just the model!). ✈

Cool Power; a division of Morgan Fuel
(800) 633-7556; morganfuel.com.

Global Hobby Distributors (800) 854-8471;
globalhobby.com.

JR; distributed by Horizon Hobby Inc.;
(877) 504-0233; horizonhobby.com.

Magnum Engines; distributed by Global Hobby Distributors.

Great Planes RV-4

Sport-scale aerobatic Sunday flyer



by Jim Onorato

The RV-4 ranks among the most popular homebuilt aircraft in history. Between 900 and 1,000 of them have been built and flown in countries all over the world. Although it isn't specifically intended to be a vehicle for showy aerobatics, the RV-4 has proven quite capable of such maneuvers. Much like its full-size counterpart, the Great Planes RV-4 model seems to exhibit the same split personality; although it's a natural for smooth Sunday sport flying, this model can also be an aerobatic powerhouse.

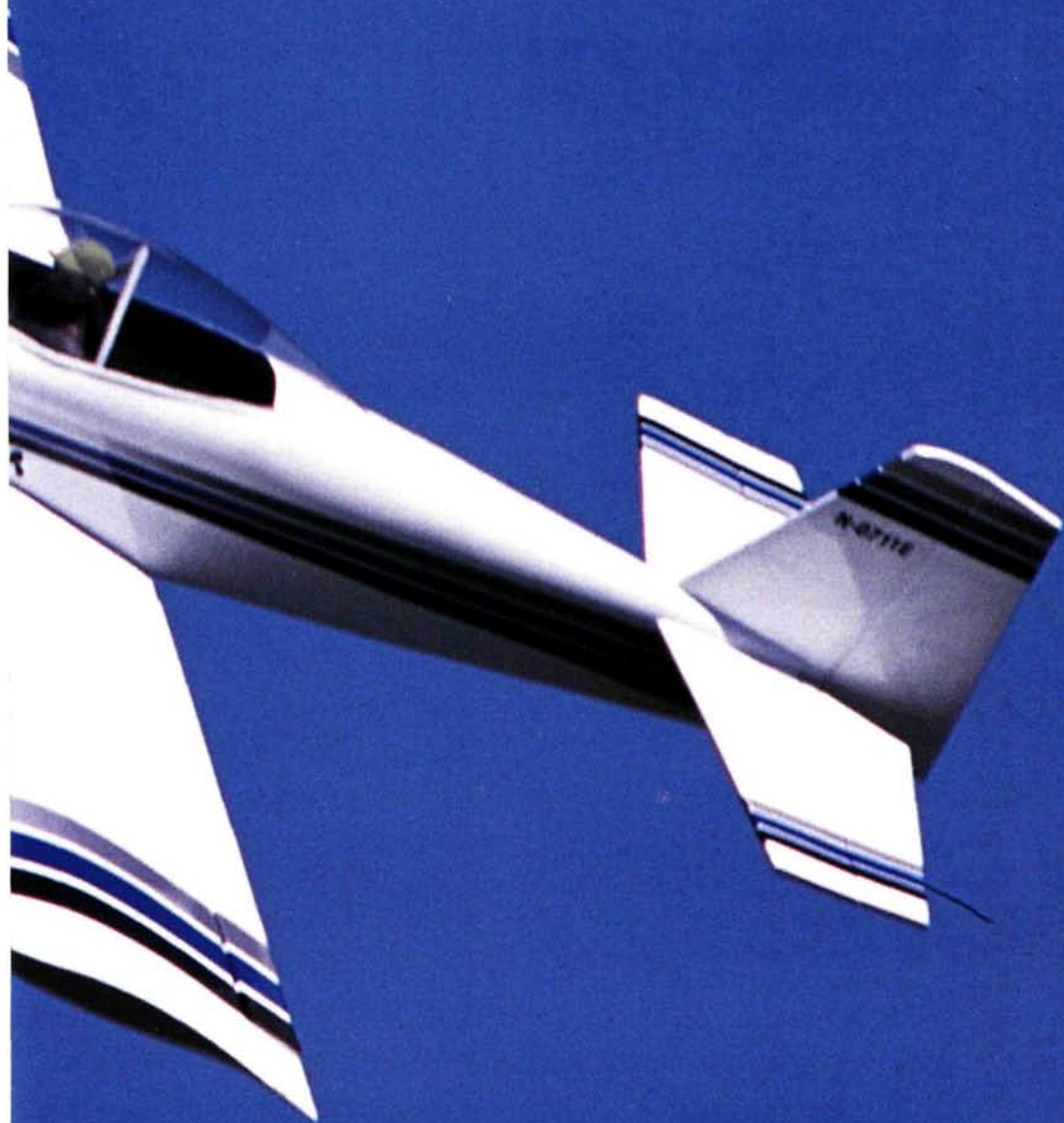
THE KIT

The RV-4 kit features balsa and lite-ply construction with basswood wing spars and an ABS plastic cowl, wingtips and wheel pants. Other items include a generous hardware package; hinges; an adjustable engine mount; preformed, aircraft-grade aluminum landing gear; self-adhesive decals and a vacuum-formed windshield. A rolled, two-sheet, computer-drawn plan and an excellent 52-page instruction manual complete the package. This is a typical Great Planes kit, with the high-quality materials and excellent parts fit that modelers have learned to expect from this company.

CONSTRUCTION

I used Great Planes' thin and medium Pro CAs and accelerator for most of the construction, but I used six-minute and 30-minute Pro Pox on the firewall, wing-spar joiners, wing-bolt blocks and landing-gear blocks.

- **Tailpieces.** The fin, rudder, stab and elevator were all built directly over the plan using 1/4-inch stripwood and laminated 1/8-inch die-cut balsa parts. I added an extra piece of balsa at the bottom of the fin to provide a place for the covering to adhere. The model came with CA-type hinges, but



PHOTOS BY JIM ONGRATO

I didn't install them until after I had covered the model.

• **Wing.** The wing has a constant chord and a fully symmetrical Selig 8036 airfoil. It uses a one-piece, notched shear web onto which I positioned die-cut balsa ribs, followed by two $\frac{1}{8}$ x $\frac{1}{4}$ -inch basswood spars and an $\frac{1}{8}$ -inch die-cut balsa trailing edge. I assembled the whole thing over the plan and then glued the pieces together with thin CA. One discrepancy I noticed in the plan and instructions concerned the placement of root rib W1. To correspond to the wing's dihedral angle, this rib has to be set at a

slant instead of vertically, as shown. A dihedral gauge would have been helpful here. I didn't remove the wing from the building board until after I had glued on the $\frac{3}{32}$ -inch leading-edge sheeting, the trailing-edge sheeting and the capstrips. I then turned the wing over and sheeted the bottom.

The instructions covering the construction of the trailing edge where the wing bolts are to be installed were a bit complicated. Study each step carefully before you begin this part of the construction. I found it easier to shape the balsa blocks before they were glued into place.

The RV-4 has molded ABS plastic wingtips. These were trimmed and glued into place, and I sanded the wing to match their contours. You can leave the tips off until after the wing has been covered; then paint and attach them.

Next, I built the ailerons and functional flaps using the plan as a guide. I then trial-fit them to the wing with the provided hinges. I joined the wing halves with an $\frac{1}{8}$ -inch lite-ply dihedral brace and an $\frac{1}{8}$ -inch dihedral brace doubler then slid this assembly into the openings in the ribs and twisted it into place against the spars. I used 30-minute Pro Poxxy for this joint.

SPECIFICATIONS

MODEL: RV-4

MANUFACTURER: Great Planes Model Manufacturing Co.

TYPE: .40-size sport-scale

WINGSPAN: 54½ in.

WING AREA: 628.8 sq. in.

WEIGHT: 6 lb., 4 oz.

WING LOADING: 22.9 oz./sq. ft.

LENGTH: 49½ in.

ENGINE REQ'D: .40 to .52 2-stroke or .52 to .70 4-stroke

ENGINE USED: O.S. .46 FX 2-stroke

FUEL USED: Cool Power 10%

RADIO REQ'D: 4-channel with 5 servos (rudder, elevator, throttle and 2 ailerons); 5-channel with 7 servos for optional flaps

RADIO USED: Futaba FP-T7 UAF transmitter, Futaba FP-R129 DP receiver and 7 standard Futaba servos

PROP USED: Top Flite 11x7

STREET PRICE: \$94.99

FEATURES: balsa and lite-ply construction with computer-designed, interlocking parts; built-up tail feathers; fully symmetrical airfoil; substantial hardware package includes an adjustable engine mount, aluminum landing gear and hinges; vacuum-formed clear canopy; ABS cowl and wheel pants; self-stick decals; a two-sheet, full-size plan; a 52-page, step-by-step, photo-illustrated instruction manual.

COMMENTS: the RV-4 is a high-quality kit that is easy to build, looks great and flies well. Sunday fliers should enjoy the versatility of its flight envelope, which ranges from a slow crawl (with flaps down) to exciting aerobatic maneuvers.

HITS

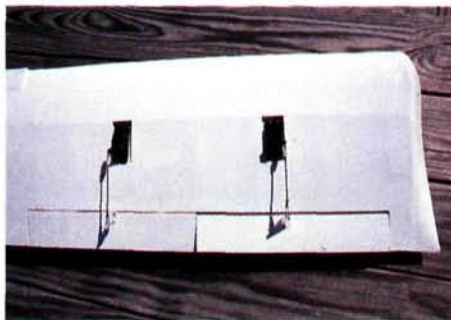
- High-quality materials and die-cut parts.
- Excellent, step-by-step instruction manual.
- Substantial hardware package.
- Excellent flight performance.

MISSES

- Poorly defined cut lines on ABS parts.

I assembled four servo trays for the aileron and flap servos and glued them into the wing at the locations shown on the plan. The addition of the center sheeting completed the wing's construction.

• **Fuselage.** The fuselage is primarily constructed of die-cut, lite-ply parts. The die-cutting is excellent, and the parts fit perfectly. Great Planes uses computer-designed, interlocking parts to ensure a strong and



With a separate servo for each aileron and flap, the RV-4 can perform amazing aerobatics. This model can do just about any maneuver.

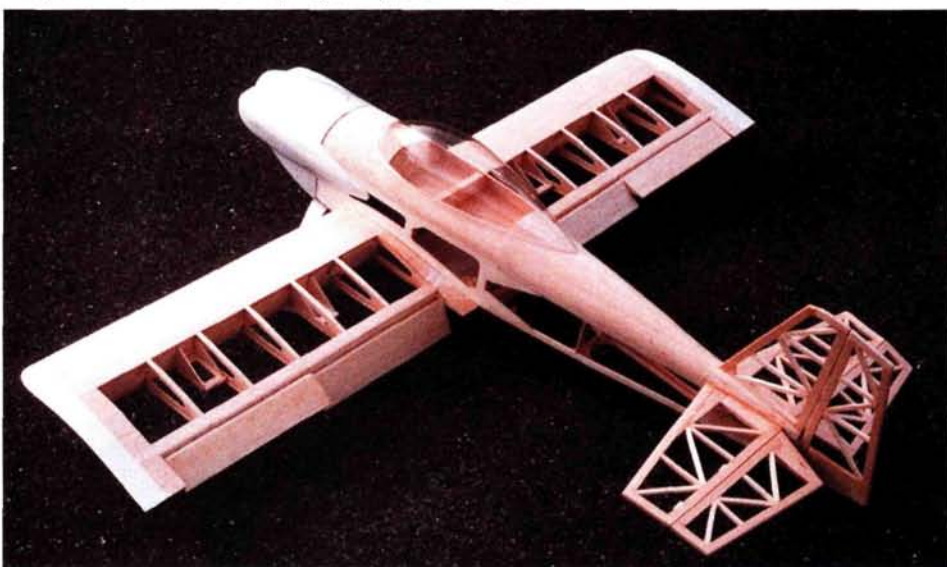
straight fuselage. Pushrod routing holes on all of the formers take the guesswork out of the installation.

After the side, top and bottom subassemblies were built, I assembled the fuselage upside-down over the plan. Make sure that you build both a left and a right fuselage side, and that the firewall notches are correctly cut so that the firewall has built-in right thrust. Also, when you assemble components that reference the

right or left side of the fuselage, take the time to be sure you are working with the correct side.

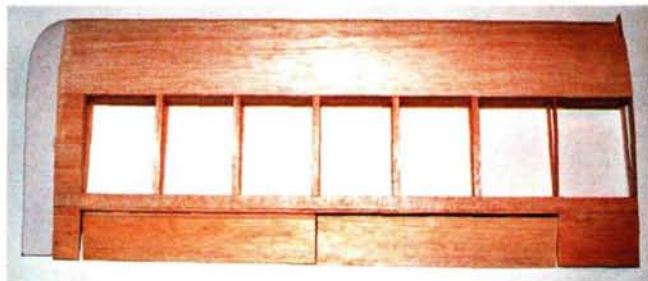
I sheeted the turtle deck and the top of the fuselage forward of the canopy with ⅝-inch balsa. Patterns are provided with the kit, but a lot of trimming is required. I sprayed the out-facing sides of the balsa sheets with water and ammonia so that they wouldn't split when bent around the formers.

My RV-4, ready to be covered. Thanks to the high-quality, die-cut, fully interlocking parts, getting to this point doesn't take as long as you might think it would.



• **Engine and radio installation.** Great Planes recommends an engine in the .40 to .52 2-stroke or .52 to .70 4-stroke range. If you select one from the upper end of this range, keep in mind that the RV-4 is a scale model intended to fly at scale speeds; prudent throttle management should be practiced. I chose an O.S. .46 FX 2-stroke engine for my RV-4 and side-mounted it using the Great Planes adjustable engine mount provided. I used a Bisson Pitts-style muffler that fit entirely inside the cowl.

The RV-4's roomy fuselage made it easy to install the radio equipment. I installed the rudder, elevator and throttle servos behind the fuel tank, and I secured the



Here, one wing half is completely built up and ready to be joined to the other. The kit includes ABS plastic wingtips, which I trimmed and glued into place before I sanded the entire wing to match their contours.

receiver battery behind the servos, close to the trailing edge. I wrapped the receiver in foam and installed it alongside the fuel tank. I used standard Futaba servos throughout and connected them to the control surfaces with the hardware provided. The elevator halves required two pushrods that were connected at the servo.

• **Final steps.** The RV-4's ABS plastic cowl is molded as two pieces—a top and a bottom.

The instructions have recommendations for high- and low-rate control throws. I set up the control throws per the instructions and used the low rates for the initial flights. I do all my flying from a grass runway.

TAKEOFF AND LANDING

The main wheels on the RV-4 are far enough forward to give the plane a solid feel on the ground, with no tendency to ground loop or nose over. As with all tail-draggers, I hold a bit of up-elevator on takeoff to keep the tail down; I then gradually advance the throttle. As the model gains speed, I decrease the up-elevator to allow the tail to come off the ground. When the model reaches flying speed, I apply just a touch of up-elevator, and the RV-4 is airborne. Depending on the engine size, you might have to apply right rudder to counteract the engine torque. With the O.S. .46 FX, I don't have to apply very much.

The RV-4 has a very shallow glide ratio that, when combined with its light wing loading, makes for easy landings. With the flaps deployed, it slows to a crawl; a slight flare just before touchdown is all you need for beautiful 3-point landings.

SLOW-SPEED PERFORMANCE

One of the things I like most about the RV-4 is its ability to fly slowly without sacrificing stability. It has a very low stall speed, and its stalls are gentle and straight-ahead. I attribute this to its constant-chord wing and light wing loading.

HIGH-SPEED PERFORMANCE

With the O.S. .46 FX at full throttle, the RV-4 moves along at a fairly nice clip—fast, but not too fast. Keep in mind that this is a

very aerobatic airplane, and it doesn't have the self-righting characteristics of a trainer. You shouldn't experience any bad tendencies at top speed, but you must keep on the sticks at all times.



AEROBATICS

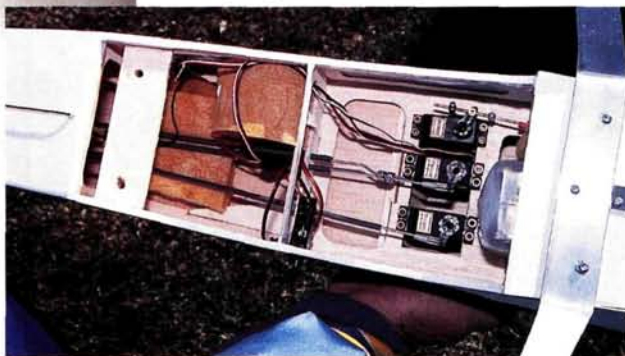
The RV-4 handles most aerobatic maneuvers with ease. If a separate servo is installed for each aileron and flap, you can perform all sorts of fancy tricks. With typical aileron settings, the roll rate is pretty good, but when the ailerons and flaps are coupled, the roll rate is incredibly fast! By coupling the flaps with the elevator, you can really tighten the loops. The RV-4 also tumbles with ease and does lightning-fast snap rolls. I'm still finding new things to do with this very nimble flyer.



Constructed mostly of die-cut, lite-ply parts, the fuselage goes together extremely straight. First build the side, top and bottom subassemblies and then assemble the fuselage upside-down over the plan.

The molded-in cut lines on my cowl weren't very well defined, and I had to be very careful when I trimmed the halves. I

Fitting the radio gear inside this fuselage wasn't a problem. The RV-4 accommodates everything, with room to spare.



had the same problem with the wheel pants.

I covered the entire plane with Top Flite white MonoKote, used silver, black and royal blue MonoKote trim sheets for the stripes and used the included self-stick decals

I think the Top Flite prop, Great Planes spinner and DGA pilot figure are nice finishing touches. They really contribute to the appeal of this model.

for the graphics. I painted the cowl and wheel pants with white Top Flite LustreKote. I added a 1/8-scale DGA pilot figure and attached the clear canopy with R-56 canopy glue. I used an 11x7 Top Flite wooden prop and a 2 1/4-inch Great Planes plastic spinner.

CONCLUSION

The Great Planes RV-4 is a high-quality, easy-to-build kit that looks great on the ground and in the air. If you're experienced at flying low-wing sport planes, give this one a try. It's highly aerobatic yet stable at low speed. You'll be proud to take this one to the flying field. ✚

DGA Designs (716) 393-1838; dgadesigns.com.

Futaba; distributed by Great Planes Model Distributors; futaba-rc.com.

Great Planes Model Distributors Co. (800) 682-8948; greatplanes.com.

O.S.; distributed by Great Planes Model Distributors; osengines.com.

Top Flite; distributed by Great Planes Model Distributors; top-flite.com.



Hangar 9 Alpha Trainer

Complete package for the first-time flier

by Dave Martin

In the air, Hangar 9's new Alpha Trainer is attractive and flies smoothly, and from a distance you would be hard-pressed to distinguish it from other high-wing, long-tail trainers seen every weekend at fields across the country. But when it taxis close and the pilot shuts the engine down, you may wonder what this engine with its angled cooling fins is. And what is that black thing behind the prop? The engine is the new .46-size Evolution A, and the thick black disc is a flywheel for easy engine starting and a smooth idle.

The pretuned and run-in engine, the special 3-blade propeller and the flywheel make up the Evolution Engines Trainer Power System. It's designed to ensure success for the first-time RC pilot, and it works.

WHAT'S IN THE BOX

Hangar 9 labels this airplane ready to fly (RTF), and it's right; it nearly flies out of the box! The engine and fuel tank have been installed, and color-coded fuel and vent lines are in place. The box contains a JR 4-channel Quattro radio complete with

a buddy-cord system that's compatible with any JR radio. The receiver, battery and all four servos have been installed along with their pushrods, which are factory-adjusted to the proper length. The clevises are oriented correctly to be attached to their control horns, the receiver and battery are out of sight in their foam-protected space, and the mounted receiver switch is ready to turn the system on.

ASSEMBLY

There is very little assembly. The entire sequence is presented in the manual as a

two-page drawing; you could easily complete the model without reading the text. You'll need a medium Phillips-head screwdriver and a wrench to tighten the prop nut. There is nothing to glue.

- **Wing.** Push one end of the thick-wall aluminum wing-joiner tube into the wing root hole in one wing half, and slide the other end into the other wing half. Trailing-edge pins ensure the proper alignment of the panels, which are held together with clear tape that is wrapped around the center of the wing. I started the tape



on the top trailing edge and attached it along the gap to the leading edge and then along the bottom center of the wing.

Because the aileron servo is mounted on the bottom of the left wing near the wing root, I cut the tape just short of the servo and then resumed taping the gap behind the servo. The left aileron linkage was already attached to the left strip aileron. The remaining task was to connect the right aileron pushrod to its horn. The clevis had been preset on the rod and needed no adjustment to fair the right aileron with the servo set in its center

(neutral) position.

It took less than 2 minutes to complete the wing.

- **Fuselage.** The wheels come attached to the main landing-gear legs, which you plug into the fuselage bottom and fasten with two nylon straps held by four screws. Another 2 minutes.

It took a bit longer to attach the empennage. I had to slightly open the holes in the horizontal stabilizer to accommodate the threaded studs that have been mounted in the vertical

fin/rudder unit. Pushed through the stabilizer, these studs lock the fin to the stabilizer with the help of washers, tiny wing nuts and a bit of supplied thread-lock. Another 3 minutes gone, but if you need your round jewelers' file (as I did) and know right where it is, you can cut that time in half.

The final task is to attach the empennage to the fuselage. I placed the fuselage upside-down and noted two bolt holes in the top of the tail. The assembly sequence indicates that screws must be inserted through these holes into mating T-nuts in

SPECIFICATIONS

MODEL: Alpha Trainer

MANUFACTURER: Hangar 9

DISTRIBUTOR: Horizon Hobby Inc.

TYPE: ready-to-fly trainer

WINGSPAN: 63 in.

LENGTH: 25.2 in.

WEIGHT: 5 lb., 4 oz.

WING AREA: 710 sq. in.

WING LOADING: 17.0 oz./sq. ft.

ENGINE INSTALLED: .46-size
Evolution Engines Alpha A

RADIO INSTALLED: JR 4-channel
Quattro w/4 NES-527 servos, R700
receiver and JR 600mAh battery
pack.

PROP: 10-in., 3-blade Hangar 9 EVOE
100P (included)

FUEL USED: Performance Plus 15%
nitro

STREET PRICE: \$309.99

FEATURES: balsa and plywood air-
frame covered with UltraCote;
installed Evolution Trainer Power
System; installed JR Quattro radio;
15- to 30-minute assembly.

COMMENTS: with the help of a good
instructor, the Alpha Trainer will get
any student off to an excellent start.

HITS

- Outstanding trainer performance.
- Excellent airframe quality.
- Everything is installed.
- Assembly is incredibly quick.

MISSES

- Some basic information is not
included in the manual (e.g., engine
and tank size, prop and glow-plug
designations).



The parts come out of the box looking like this; no glue required.

the horizontal stab, but this was easier said than done. The elevator pushrod and the antenna pass through a 1 $\frac{3}{4}$ x $\frac{3}{4}$ -inch opening in the fuselage rear. The fuselage sides are tapered, so it is easy to start the rear empennage attachment screw. Not so with the forward screw. Although there is a hole in the bottom of the fuselage to accommodate the Phillips-head screwdriver, and I was able to hold the screw, the stiff pushrod got in the way and made it difficult to start it. I needed a pair of forceps and a mini flashlight to finish the job. Instead of doing this, you might want to attach the tail in bright light—maybe outside—and hold the pushrod aside with a spring-type clothespin.

• **Propeller.** A separate instruction sheet provided details on how to mount the special 3-blade, reinforced-plastic propeller and spinner. Your Phillips-head screwdriver must be just the right size—small enough to fit into the spinner holes but large enough to match the slots.

Although the prop would work fine as supplied, I invested a few extra minutes to balance it and minimize vibration. It took another 4 minutes to mount the balanced prop and spinner, but I dallied.

like to tie a new model to something solid during first engine runs, so I slipped a large loop of nylon cord over the tail and tied the end of the cord to a tree.

Engine-starting instructions are complete, and I followed them. The manual states that low- and high-speed carburetor settings have been made at the factory. Oh yeah? This I have to see.

Pumping fuel into the tank, I measured its 10-ounce capacity (the manual doesn't reveal tank size), and I primed the engine as described.

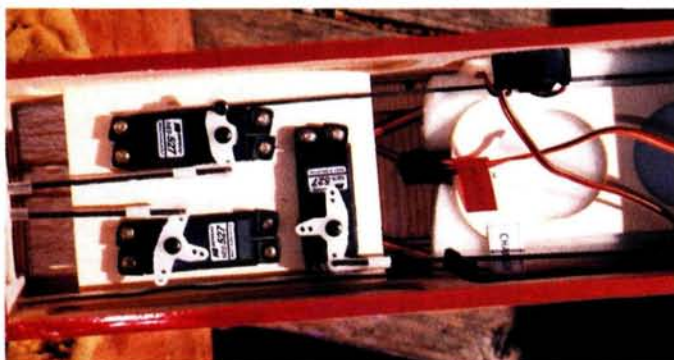
After I had attached a glow driver to the glow plug (it's angled away from the propeller on the engine for safety), I put on eye protection and used an engine-starting stick to flip the prop counterclockwise (viewed from the front).

Wow! The engine started on the first flip, and it continued to run smoothly at idle even after the glow driver had been removed. After warmup, I ran the throttle to a mid setting and then to full power. It sounded perfect. The engine kept running after I throttled it back to idle, and I shut it off with throttle trim.

In all my years of modeling, I've gotten new model engines to start on the first flip exactly twice before. Maybe I need lessons from the Hangar 9 factory, because it turns out that these engines are run in and adjusted before they are shipped. Amazing!

THE POWER SYSTEM

A call to Horizon provided helpful details not mentioned in the manual. The special propeller, an EVOE 100P, was designed to be used with this engine in a training



The RTF Alpha Trainer comes with the JR radio system installed. The system includes pushrods of the correct length, labeled aileron and charge leads and a mounted on/off switch. The receiver and battery are packed in foam under the plywood retainer on the right.

NEXT STEPS

Running the engine in the backyard was next. I

TAKEOFF AND LANDING

In less-than-ideal conditions (7 to 8mph winds with frequent gusts), the Alpha Trainer's wide-stance gear allowed a down-the-runway cross-wind takeoff without fuss. Two clicks of up-elevator trim resulted in an impressive hands-off climb rate. No other trims were required.

The first landing (in a gust) was a two-hop bounce job, but subsequent touchdowns were smooth two-pointers on the main wheels. Taxiing in a gusty crosswind was easy; the Alpha Trainer didn't have any tendency to upset. The wide gear helps. Nose-gear steering was straight and not twitchy—just right for a trainer.

LOW-SPEED PERFORMANCE

Throttling and trimming back for slowest flight yielded no stall break, and the wing remained level at the stall, which proves that it is built straight. Even in the wind, the Alpha Trainer was easy to trim for a slow-speed approach. At mid-throttle settings,



it was difficult to hear the engine because it was so quiet.

HIGH-SPEED PERFORMANCE

The Alpha Trainer is not meant for high-speed flight, but full-power, forward-trim cruising feels and looks solid and is not overly sensitive. The need to trim differently for thumbs-off flight at different speeds proves that it

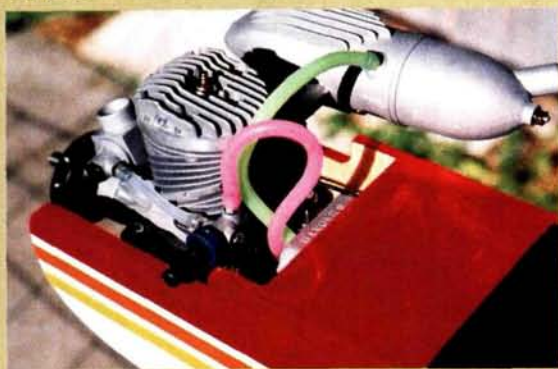
has positive pitch stability—an excellent feature in a trainer.

AEROBATICS

The Alpha Trainer has enough power to practice a wide range of large, smooth aerobatics. Nothing happens quickly. The wing and tail bottoms are covered with red UltraCote, and the rest of the airplane is white with trim; this should help with orientation. The model's large size and slow flight make it an ideal aerobatics trainer. Rudder is needed with aileron for rolling maneuvers; this is also excellent for training.

EVOLUTION TRAINER POWER SYSTEM

The Evolution Trainer Power System is the key to a painless introduction to 2-stroke power. The .46-size engine has been run in and adjusted at the factory; you need only to mount the special propeller. Note the black flywheel and the blue throttle-valve restricter. After it was primed, the engine started and continued running each time we hooked up the battery and flipped the prop.



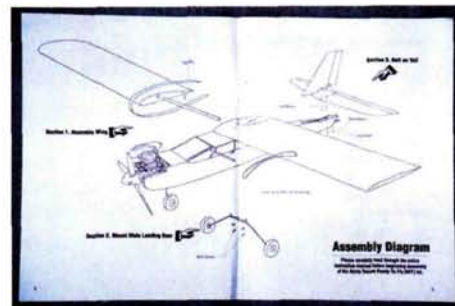
environment, so the Alpha's top speed is intentionally restricted. The glow plug is a Hangar 9 2-stroke Superplug. Horizon notes that its engineers placed special emphasis on easy starting and quiet operation. Both the high-power and the idle fuel-mixture screws have restricted movement, yet there is enough range to accommodate conditions such as high-density altitudes, where the mixture needs to be leaner. Because these details are not in the manual, newcomers will probably need assistance from more experienced modelers with regard to maintenance and replacement parts.

Removing the muffler confirmed that the engine is lapped, not ringed, and a perforated disc in the muffler reduces engine noise.

CONCLUSIONS

My flying buddy, Frank Gagliardi, flew the Alpha for the flight photos and said, "This is the best ARF that I've ever flown." (It's actually an RTF.)

Hangar 9's Alpha Trainer does everything well, and the



This two-page spread in the manual shows every assembly step except propeller installation. The whole process may take half an hour, if you include a lengthy break!

Evolution Trainer Power System is a breakthrough. This model is so easy to make flight-ready that a new pilot will be ready for flight instruction in minutes. It flies so well that a beginner shouldn't have any trouble finding a qualified instructor who will be happy to provide a first test flight followed by buddy-box time.

Considering all that's included (you just have to buy fuel and a starting battery) and the work completed by the manufacturer, Hangar 9's Alpha Trainer is quite a bargain. ✚

Hangar 9; distributed by Horizon Hobby (800) 338-4639; horizonhobby.com.

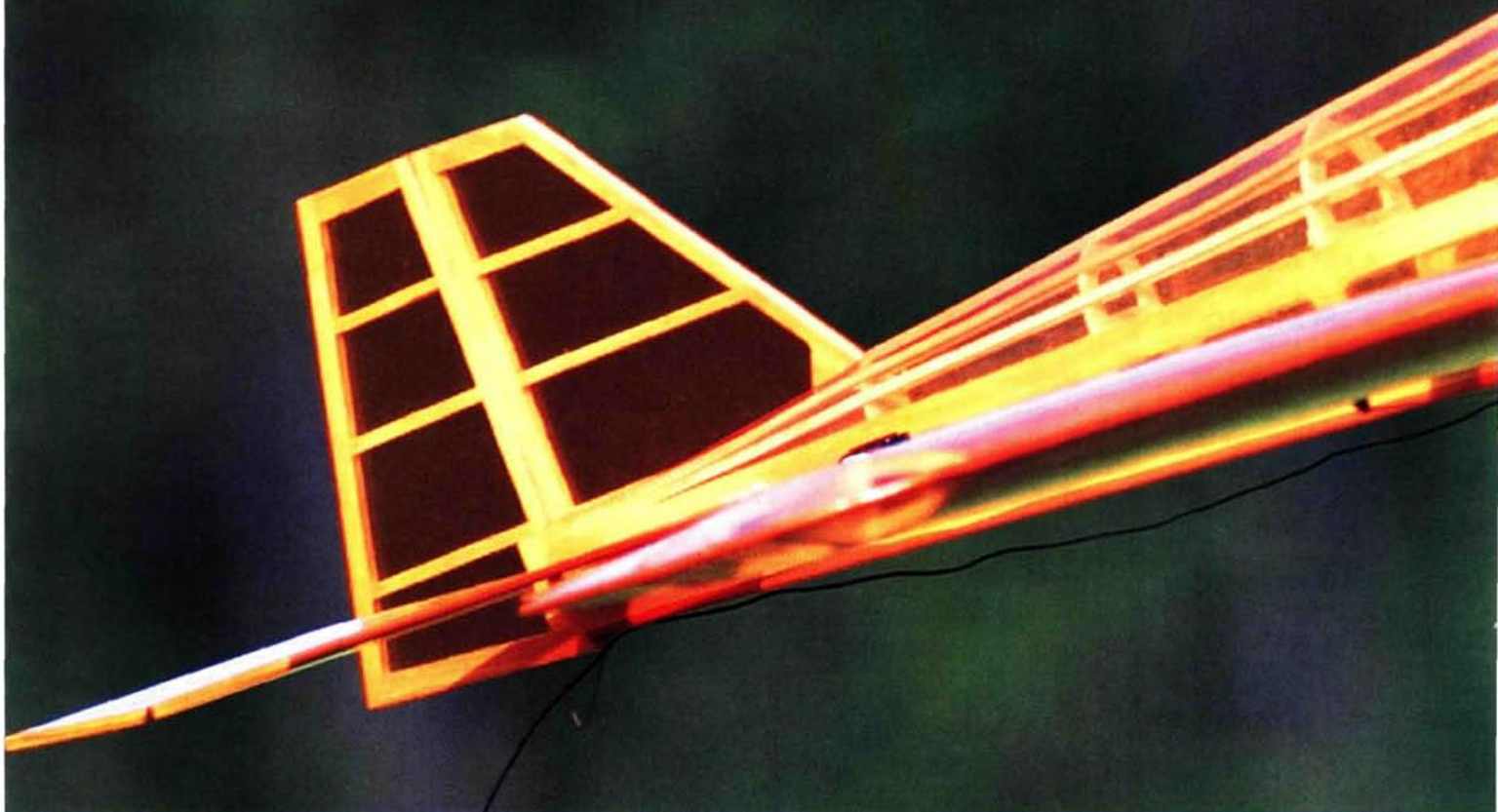
JR; distributed by Horizon Hobby.

Performance Plus; a division of West Coast Composites (808) 788-4856; pppfuel.com.

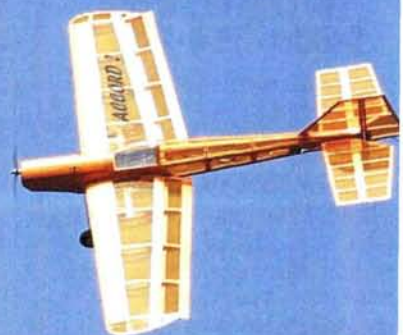
Northeast Sailplane Products Accord II

by Greg Gimlick

Almost-ready-to-fly electric aerobat



The quality and availability of almost-ready-to-fly models continue to improve at a furious pace. As manufacturers produce more and more high-quality "plug-n-play" models, we modelers reap the rewards. With the introduction of the Accord II, Northeast Sailplane Products helps perpetuate this trend. One look in the box, and I know you'll be as impressed as I was with the well-cut joints and beautifully covered airframe. This one's going to be tough to top.



PHOTOS BY JOHN KAUK

I used the recommended control throws on the low rate, and for a bit more fun, I set up the high rate to have more travel. After giving the battery a full charge, I headed to the field. The Accord II can take off from both pavement and moderately high grass. I usually take off from a grass field.

TAKEOFF AND LANDING

Within 50 feet, this plane climbs with vigor. I apply a bit of up-elevator as it leaves the ground and then neutralize the control as it climbs out. If you hold the elevator at full throttle, the

Accord II will climb very steeply and in a hurry.

Landing is easy; this plane is capable of slowing down more than you might think. If you're flying off grass, you can position it and slow it down for a nice 3-point landing that will barely roll.

HIGH-SPEED PERFORMANCE

On 8 cells, this plane really scoots. It will also get small in a hurry if you're not careful. ElectricCalc predicts speeds of about 40mph with the APC 10x7 prop spinning at full throttle. Even with the

control throws set beyond the recommended levels, the model remains well behaved.

LOW-SPEED PERFORMANCE

The plane slows down nicely and stalls straight ahead with no scary recovery. I haven't seen this model exhibit any bad habits while flying slowly, though it has had plenty of opportunity.

AEROBATICS

Aerobatics is where this model really shines. The Accord II is very sporty on the power setup I chose,

and I have no doubt that 3D maneuvers are possible with a brushless upgrade. As is, this plane can easily perform all of the standard aerobatic maneuvers. When I increase my alleron throws to 45 degrees and the elevator to almost 1 inch of throw, this plane's flight characteristics change dramatically. Rolls become extremely fast, and at high speed, full up-elevator produces a flop that is quite interesting. The plane, however, shows no signs of stalling.



This is what you'll find the moment you take the Accord II out of the box. The main airframe comes completely built up and covered, and this makes assembly a breeze.

WHAT'S IN THE BOX?

The main components (fuselage, wing and tailpieces) are constructed primarily of balsa and come completely built and covered with Solarfilm; they need only be assembled. The Accord II also comes with a Speed 480 motor with MP Jet reduction drive, landing gear, an APC prop with prop adapter, a clear canopy, instructions and a complete set of hardware. You simply provide the glue, hinge tape and radio gear to complete the model.

ASSEMBLY

The canopy requires some minor trimming, but that's about as time-consuming as this assembly gets. Begin by checking the wings for warps; these can easily be corrected with a bit of heat, if necessary. Mine were straight and didn't require any correction.

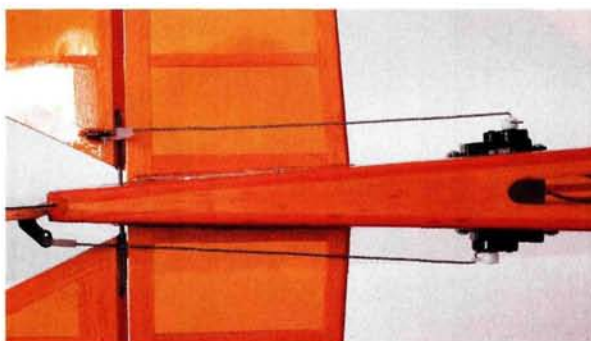
First, you must cut away some covering so you can glue the plywood reinforcing

plate into position. The wing comes with a hole already drilled; use this hole as a guide to drill through the plate to ensure that everything lines up.

Next, the ailerons must be hinged in place, and for that, I used my favorite hinge tape from SR Batteries. This stuff is incredibly strong and cannot be easily removed, so be sure that you get it right the first time. Use a knife to cut open the servo-mounting holes, and bolt your servos into place. I chose to use Hitec HS-55 servos throughout. Use the included pushrods to connect

each servo to the appropriate aileron. This requires that you form Z-bends in the control surface end of the pushrods.

The elevator assembly is fairly straightforward. To join the elevator halves, simply epoxy the wire joiner in place. Once



The rudder and elevator servos are on the exterior of the fuselage, toward the rear.

again, use hinge tape to attach the surfaces to the stabilizer, and you're ready to glue the entire assembly onto the fuselage. The same holds true for the vertical fin



SPECIFICATIONS

MODEL: Accord II

MANUFACTURER: Airwise Intl. Inc

DISTRIBUTOR: Northeast Sailplane Products

WINGSPAN: 36 in.

WING AREA: 325 sq. in.

WING LOADING: 9.7 oz./sq. ft.

LENGTH: 35 in.

WEIGHT: 22 oz.

POWER SYSTEM: Speed 480 motor geared 2.33:1 and an APC 10x7 prop (included)

RADIO REQ'D: 4-channel w/4 microservos (elevator, rudder, speed control and ailerons)

RADIO USED: Hitec Eclipse 7 radio and 555 receiver, 4 HS-55 servos and a Jeti 350 ESC

BATTERY USED: 8-cell, 600mAh Ni-Cd

PRICE: \$139.95

FEATURES: the balsa wings, fuselage and tail come built and covered with Solarfilm; wings feature D-tube construction with a carbon-fiber spar for reinforcement; package also includes Speed 480 motor with MP Jet reduction drive, landing gear, a clear canopy, wheels, a prop, prop adapter, instructions and a complete hardware package.

COMMENTS: this plane can be in the air in no time. All of the parts are well made and go together easily. Even the radio equipment seems to just fall into place. I was extremely impressed with the quality and completeness of this package, but its performance in the air is far and away the Accord II's most amazing feature.

HITS

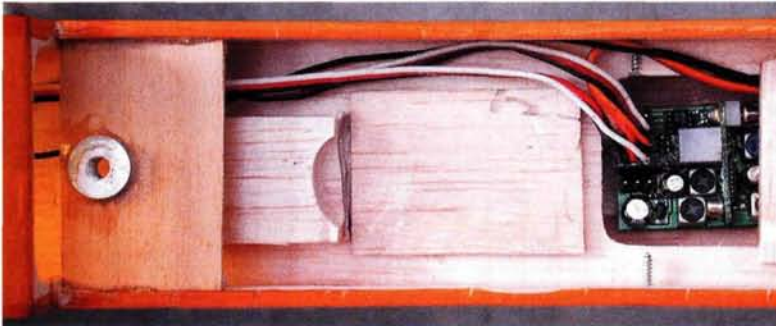
- High-quality parts.
- Ease of construction.
- Excellent flight performance.

MISSES

- None.

and rudder. After making sure that everything was square, I epoxied the tail feathers into place. The servos for the tail surfaces should be mounted in the rear of the fuselage, just as they are in giant-scale planes. This requires extension wires; I suggest that you find the lightest ones you can.

After making sure everything lined up, I cut slots in the control surfaces for the included control horns. I've used these horns in the past and have found that I prefer to attach them with a small drop of epoxy instead of CA. It just seems to hold better over time. At this point, you simply



Here, you can see the fuselage mounting plate with the threaded blind nut epoxied into place. Because the receiver must be mounted on the top of the fuselage, the balsa pads were necessary to provide clearance between the wires and the battery when installed.

have to fit the canopy and install the wire landing gear to complete the assembly of the main airframe.

RADIO INSTALLATION

I installed the remaining servos (rudder and elevator) in the fuselage, along with a Hitec 555 receiver (without the case). Because the receiver is mounted on the top of the fuselage, I found that its battery pack squashed the servo wires. To create some space between the battery pack and the wires, I installed small, light balsa pads. If you use a receiver with end connections, this probably won't be necessary. I installed the Jeti speed control in the forward compartment alongside the motor. The connections can be accessed

through the hatch in the bottom of the fuselage.

POWER SETUP

My Accord II came with a Speed 480 motor and 2.33:1 gearbox. You'll need to



I use this New Creations pinion press whenever I have to install pinion gears. It's really a time-saver.

assemble the gearbox, but the process is clearly explained in the instructions. I always use my New Creations R/C pinion press when I install pinion gears. This allows me to see just how far the gear gets pushed onto the shaft. It also prevents damage to the rear of the shaft by supporting it. Use the method of your choice; just be sure that you're careful. Simply press together the remainder of the gearbox assembly, and bolt the mount adapter onto the front.

Because this kit was originally designed with a direct-drive motor in mind, using the geared setup requires that you modify the bulkhead behind the motor. Simply cut out a small section of the bulkhead; this allows the motor to drop nicely into place. The mounting adapter is a stroke of genius because it is bolted directly to the firewall and allows the geared motor to fit completely inside the fuselage. Once the motor was mounted, I installed the included prop adapter.

Northeast Sailplane recommends either a 7- or 8-cell battery pack. I chose to use an 8-cell, 600mAh Ni-Cd battery, which provides a very sporty power system. A Jeti 350 speed control with BEC completes it.

CONCLUSION

This is a beautiful almost-ready-to-fly model and a great value. The assembly can be completed in a single evening, and the model can be in the air the very next day. Though the Accord II was designed for advanced fliers, it would be suitable for intermediate fliers if set up conservatively. I really like this plane, and its size makes it easy to toss in the car for a quick flying session. If you're looking for a small, very aerobatic ARF, I recommend it highly. ✚

Airwise Intl. Inc.; distributed by Northeast Sailplane Products.

ElectriCalc; distributed by SLK Electronics (910) 676-1681.

Hitec RCD Inc. (858) 748-6948; hitecrad.com.

Jeti; distributed by Hobby Lobby Inc. (615) 373-1444; hobby-lobby.com.

New Creations R/C (936) 856-4630; newcreations-rc.com.

Northeast Sailplane Products (802) 655-7700; nesail.com.

SR Batteries Inc. (631) 286-0079; srbatteries.com.



Left: you must modify the bulkhead slightly to ensure that the geared motor lies nicely in place. I used double-sided tape to attach the Jeti speed control to the side of the fuselage. Right: with the motor bolted to the firewall and the prop adapter attached, installation of the drive system is nearly complete.

NEW OLYMPICS-STYLE TECHNIQUE FOR IMPRESSIVE RESULTS

DISCUS- LAUNCH GLIDERS

by Dave Garwood

DO YOU LOVE THE SIMPLICITY OF hand-launched gliders but hate having a strained shoulder after a day of throwing them? When flying hand-launch, do you wish you had longer flight times to find thermals before the next relaunch? Do you envy the impressive launch heights achieved by truly athletic pilots? Discus-launch gliders (DLGs) tackle all three problems.

Hand-launch gliders (HLGs) are the purest form of RC soaring; it's just you, your sailplane and the air. There's no high-start or winch to set up; you just heave the plane and go hunting for lift. Few things in RC flight are as satisfying as chucking a 60-inch glider, coring a thermal and circling up until the plane is a speck in the sky. But in the effort to get ever higher launches, sometimes, we damage a shoulder joint, strain finger muscles or other body parts and have to lay off hand-launching for weeks or months. Now we have the planes and the technique to

achieve launch heights that are two or three times as high, as well as longer initial flight times, with vastly reduced wear and tear on your body.

A moderately fit launcher can achieve a launch height of 40 to 50 feet in a light wind using the traditional overarm, or "javelin," launch technique. The new "discus launch," "tip launch," or "sidearm launch" method can easily double or triple the launch height—even for non-athletes. First, you need an airframe that can withstand the centrifugal loads of the launch, the increased speed at

launch and still fly well. When you have learned the launch technique, you'll be able to achieve higher launches that allow longer search times and increase the chance of finding lift on every launch and during every HLG flying session.

Model Airplane News has assembled a council of experts to help you learn the basics so you can try this technique. The advisors are: Bruce Davidson, a 2001 AMA Nationals HLG champion; Mark Drela, an aeronautics professor at MIT and avid HLG/DLG designer; and Denny Maize of Polecat Aeroworks, the manufacturer of the X-Terminator, the 2001 HLG national champion airframe.

They are enthusiastic about the practice and the potential of DLGs, and they generously shared their experiences with these model aircraft. Denny Maize not only supplied a ready-to-fly X-Terminator Pro, but also taught me enough technique by email for me to succeed at sidearm launching at my first DLG flying session. I have a desk job and can, unfortunately, answer "Yes" to all three questions in the opening paragraph, but after a single day at DLG, my interest in HLG has been renewed.



• Mark Drela launches his own-design SuperGee HLG via the DLG method.

DLG ADVANTAGES

Model Airplane News: DLG is a significant advance in HLG. It enables higher launches with reduced strain on joints and muscles. It allows less physically capable individuals to participate in HLG—the “purest” form of RC model-sailplane flight.

Mark Drela: Yep. Seems to me that it has also leveled the field at HLG contests. Flying ability has become more important than physical prowess.

Bruce Davidson: I agree that the new sidearm launching technique makes it easier for people of all physical abilities to enjoy hand-launch sailplanes.

Denny Maize: Joe Wurts put it best when he said, “It allows the old, fat, gray-haired guy a chance to be competitive.”

DLG DESIGN AND DEVELOPMENT

MAN: DLG is hard on airframes. Improved designs and stronger materials are needed.

Denny: Phew; there’s an understatement. The winter of 2001/2002 was a biggie in design and development. Everyone in the business was going crazy strengthening airframes and playing with wing layups. The worst part of the problem involved stress loads that we didn’t fully understand at the time. Boom flex, fuselage side loads and wing loads were different from what we had dealt with until DLG came along. Every time we thought we had a problem worked out, someone found a way to break it! There was one heck of a lot of R&D going on at a very fast pace.

Mark: The loads aren’t much more severe than in a very strong javelin launch—maybe twice as big. But they are in quite different places and are primarily sideways rather than up and down. The structure can be designed appropriately. Composite materials definitely make a more durable DLG; a built-up balsa/spruce DLG would be almost impossible to execute in a reasonable weight and durability.



Mark shows his grip on the wingtip peg of his DLG Super Gee.



1 The DLG in “ready position.” Mark studies the air. 2 With launch arm stretched out behind him, Mark begins his spin. 3 Mark continues his spin. 4 The spin continues; Mark’s body has now made about 1/2 revolution. 5 Mark continues his spin. 6 Mark’s body has now made about one full revolution. 7 Mark stops his spin and brings his arm forward; the glider is traveling at high speed. 8 Mark releases the plane, and his launch arm “follows through” like a golf swing.

Bruce: The stresses are in different places with the new launch technique, but with a good design, it doesn’t have to be hard on the airframe for everyday flying. Competition is a different thing, though; anything used for competition has a shorter life.

MAN: Including the readily observable strengthening needed to handle the centrifugal launch loads and higher air speeds at launch, what are the challenges in designing for DLG?

Mark: First, the flexing of the tail boom screws up trajectory. Most of the kite booms are more flexible than is ideal. The large-diameter Allegro-Lite boom solved that problem. There are now comparable booms available. Second, slop of control linkages is challenging to prevent at light weights and low friction. Third is flaperon flutter. For discus launching, you want thick flaps, but aero performance wants thin flaps—tough tradeoff. Fourth is airfoils. Although these were a challenge, I think the latest crop is quite close to ideal and is probably within manufacturing tolerances.

Denny: Guys like Mark do some incredible work in the airfoil and basic planform aspect. As a manufacturer, the issue is being able to produce a high-tech product in an affordable and practical manner for

production work. There’s a huge difference between being able to make a couple of planes for yourself and trying to make a few hundred a year.

MAN: Tell us a little about the decision on polyhedral or aileron roll control for a sidearm-launch plane.

Bruce: I think an aileron HLG is much more fun to fly and can be launched higher, but I prefer a poly for competition. I can fly a poly much smoother, and my dead-air hang time is much better—even with a compromised launch. A poly with flaps for glide-path control would be best. I feel I have a huge advantage over most HLG pilots because I throw left-handed: I can fly the sailplane through the entire launch and catch.

Mark: Poly is easier to thermal well and is probably better overall for many pilots. It requires added flaps for sink-rate control in contests and needs a somewhat bigger vertical tail to quash the hard roll tendency

click trip
MODELAIRPLANENEWS.COM

FOR MORE
INFORMATION
ON DLGs

HOW TO LAUNCH A DLG

Preparation

- Make sure you have a glider that's designed and built to take the stress of discus launch. The centrifugal loads and acceleration loads on the airframe are high. You can build your own plane or buy one (see "DLG Sources" sidebar).
- Be sure to have the radio set up according to the airframe manufacturer's specifications. You'll need to have launch presets in your transmitter for many DLG aircraft to transition from level-release, high-speed launch conditions and climb to altitude and to avoid unintended, low-level aerobatics on release. Polecat Aeroworks specifies that the X-Terminator Pro needs about $\frac{1}{16}$ -inch up-elevator and $\frac{3}{8}$ -inch right rudder in launch preset. Note: DLG designers are working to change airframe design so that you won't need transmitter launch presets.
- Hand-launch your new DLG several times via the familiar "overarm" or "javelin" method to get it trimmed for straight and level flight and to get used to the way the plane handles in the "normal" flight regime.

DISCUS LAUNCHING

- Determine the prevailing wind direction and face into the wind.
- Hold the sailplane with your launching arm outstretched behind you.
- Press the transmitter preset button.
- Spin your body one full turn, and release the plane into the wind. Note: when you spin one turn, the plane spins $1\frac{1}{4}$ turns because it started out behind you.
- The plane will climb rapidly to approximately two or three times your normal hand-launch height.
- Release the transmitter preset button.
- Give a dab of down-elevator, if needed, to prevent a stall at the top.
- Begin your search for lift.

TRAINING HINTS

- Don't try to control the launch flight path with your wrist. Let the airplane find its own groove as you are spinning. Keep it level and release it level; let the elevator preset do the work of pointing the model skyward.
- Don't launch half-heartedly. Avoid setting yourself up for the classic aviation danger: out of altitude, air speed and ideas all at the same time.
- Consider splitting the launch tasks between two pilots for early training flights (one handles the transmitter, and one handles the airplane). The launcher gets a feel for the acceleration and launch flight path of the plane, and the flier has both hands on the transmitter for instant flight corrections as needed. You may want to try both roles before you launch all by yourself.

on release. Aileron is harder to fly but more controllable in gusty air, and flap brakes come with the package. It also gives



The Polecat Aeroworks X-Terminator Pro polyhedral DLG, a stablemate of the plane Bruce Davidson used to win the 2001 AMA National HLG contest, is shown here with its hatch removed to display a 150mAh battery pack, JR 610M micro receiver and a pair of diminutive GWS Pico BB servos. The wing construction is Kevlar and carbon fiber over Spyder foam-cores; the fuselage pod and tail boom are molded of carbon fiber; and the tail parts are glass-bagged balsa.

camber control, which is a real advantage with the latest airfoil crop.

The SuperGee is a blend, which I very much favor now. It has full-span flaperons and generous dihedral (about 50 to 60 percent as much as a real poly). It is much easier to thermal than a flat-wing glider, and you still have the control punch in rough air. It's the best of both worlds.

MAN: Right now, a computer transmitter (launch preset) is required. We understand that designers are working to incorporate the presets into the airframe.

Mark: It's really not required. With a generous vertical tail and a somewhat forward CG, one can do a decent discus launch using a "dumb" transmitter. But presets do allow more CG freedom and somewhat higher launches.

A rudder gyro allows a smaller vertical



Mark Drele's SuperGee DLG is a hybrid design that has dihedral for relaxed thermal turns and full-span flaperons for handling rough air and changing airfoil camber while in flight, using flap position for slowing the plane down when landing or catching.

tail for a given amount of yaw damping right after launch. Personally, I favor the boom-flex damping-augmentation scheme employed on the SuperGee. It's certainly simpler, cheaper and more reliable than the gyro.

Denny: The biggest single cause for needing a preset or gyro (given a good design) is launch technique. I know that as my planes got better and my technique improved, I got rid of the gyro completely and eliminated most of the preset. There are also instructions on my website (www.polecataero.com) for adding a preset to a radio as simple as a Hitec Focus II. Expensive radio equipment isn't required; it's just more convenient.

DLG LAUNCHING AND FLYING

MAN: Assuming we have a sailplane that's trimmed and balanced, and that the pilot has flown javelin HLG, what is important to remember when trying DLG for the first time?

Bruce: For the first few times, I think it is best to focus on launching while someone else holds the transmitter and operates the launch preset. Don't watch the sailplane; keep your head forward. Start with the wings flat, release with the wings flat and follow through. Sidearm launching is very much like a golf swing; it should be as smooth as possible and should accelerate through the entire swing. Start with forward motion into the wind.

Denny: Throw it hard enough to have enough altitude to correct for any surprises. Keep your arm and wrist straight; release earlier than you think you should.

MAN: What are the most common mistakes that beginning sidearm launchers can make?

Denny: Trying to make really light throws at first and weird maneuvers (wrist action

and such)—trying to make the plane do something.

MAN: Once a pilot gets the hang of sidearm launching, what can be done to increase launch height?

Bruce: There are many ways to increase your launch height. The first order of business is to ensure, the sailplane is optimized by checking its throw rates, CG, etc. Tweak your launch preset so that the sailplane tracks straight out of your hand and rotates almost instantly up to 45 degrees or so. Practice, practice, practice, and make changes to the CG, launch preset and your launch technique. Video would be a useful way for you to evaluate your technique. Practice some more. High launches are great, but nothing will replace knowing how to recognize whether your sailplane is in lift or sink. If you want to improve, use a stopwatch, and time your flights whenever possible.

MAN: Thank you so much, gentlemen, for sharing your knowledge and experience. For those who have strained their shoulders pursuing HLG, and for those who long for higher launches and longer hand-launched flights, the DLG planes and techniques will provide relief and improve their game. ✚

DLG SOURCES

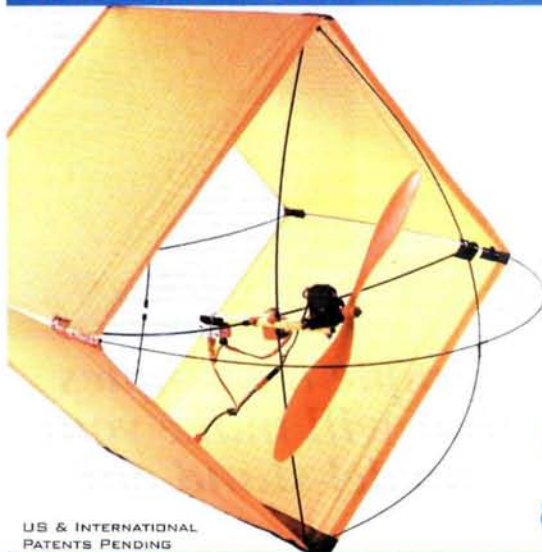
- Carl McBurnett (Texas Twister); bludartar.com.
- Dick Barker (Uplink); eskimo.com/~dickb/UpLink.html.
- Hobby Club (Gamet, Salsa, Simply Better); hobbyclub.com.
- Impact Airframes (Raven); geocities.com/impact_airframes/home.html.
- Janco Models (Avenger); jancomodels.com.
- Jerry's Models (Photon); netmeister.net/~jerry.
- Maple Leaf Design (Encore); mapleleafdesign.com.
- Mark Dreila (Build your own Apogee); charlesriverrc.org/articles/apogeehlg/markdreila_apogeehlg.htm.
- Mark Dreila (Build your own SuperGee); monkeytumble.com/hlg/supergee.htm.
- Northeast Sailplane Products (Sidewinder); nesail.com.
- Oleg Golovidov (Taboo); olgoi.com/taboo.html.
- Polecat Aeroworks (Terminator series); polecataero.com.
- Raptor Aerosports (Raptor); raptorrc.com.
- Tracy Brown (Cyberdyne); slopeflyer.com/html/cyberdyne_dlg.html.

Fly Indoors or Out...

VOLTAIR CUBE™

NEW ULTRALIGHT KITS STARTING AT:

\$89.00



U.S. & INTERNATIONAL
PATENTS PENDING



VOLTAIR
TECHNOLOGY, LLC

Check our
web site for
great prices on
Carbon Rods
& Icarex® Fabric

WWW.VOLTAIRCUBE.COM - (530) 273-3855



BalloonCraft Indoor Airship

Fly 1-4
w/Friends

Multi-speed and Proportional
Controls for Precise
Maneuvering in Small Rooms

Enjoy Indoor
Flight Games
All Year At Home!

Only \$79.95

See it fly at:

www.ReadyToFlyFun.com

Toll Free 1-866-472-8697



17" Helium
Balloons



Infrared
Joystick
Controller



Toytronix

SKY HOOKS & RIGGING

specializing in Micro R/C and Electric Free Flight
Scale Christmas Package

This 1:12 scale model captures the spirit of early flight. Running on two GWS DC-A motors, the aircraft uses an 8-cell 270 mAh battery and drives 9" props.

Package contains:

The 1903 Wright Flyer by Dare Engineering, two DC-A drives with props, the new Sky Hooks & Rigging RX72N-HYB receiver (shown at right 5/8 size) with built in speed controller, special switch harness, crystal, two sub micro servos, an 8-cell 270 mAh battery pack, and covering material. Transmitter, charger, glue and paint are not included.

\$285.00
+ \$18.00 freight



Sky Hooks & Rigging
2206 Towne Blvd.
Oakville, ON
L6H 5H4 Canada



Voice: 905-257-2101 / Fax: 905-257-0168
SEND \$4.00 FOR OUR 2001 CATALOG
or visit our online store at:

<http://www.microrc.com>



1903 Wright Flyer
wingspan 40.5"
wing area 540 sq. in.
RTF weight 12.5 oz.
3 ch R/C Rud/Thro/Elev

Finish & detail fiberglass models

by Dave Garwood

Simple techniques that will make your model stand out

There comes a time in a modeling career when you want to fly a better-looking model, and this often means a painted finish rather than an iron-on finish. Then when you get the hang of painted finishes, you may want to add the eye-catching detail of panel lines. When panel lines become routine, weathering adds more character to a model and often elicits favorable comments from other modelers.

Believe me when I tell you that I am not a high-level craftsman or a superb detailer. I rush through projects, make plenty of mistakes and believe "If you can't see it in the air, you don't need it." So, no rivet detail for me, and I don't even like detailing cockpits, so I don't use clear canopies on my planes. I have, however, learned how to make a model look really sharp from a reasonable distance by spending about 10 to 20 hours after construction on painting, panel lines and weathering.

PREPARATION FOR FINISHING

At this stage, the central theme is to prepare the model's surface to accept spray paint. Fiberglass takes paint very well and is one of the main reasons I like molded-fiberglass fuselages. (The ability to model beautiful, curved shapes and a high strength-to-weight ratio are the other main reasons.) I generally don't like to apply paint to iron-on covering because it causes trouble if I have to heat the covering to re-shrink it; heat removes paint.

One way to eliminate iron-on covering on flying surfaces is to make the external surface a fiberglass covering. Brush epoxy over the balsa and lay on light fiberglass cloth; let it cure and sand it smooth. An exception to the rule against iron-on covering is Solartex iron-on fabric, which must be stuck to the balsa so well that it

never needs to be heated with a heat gun or iron again. A light coat of 3M 77 spray adhesive on the balsa sheeting helps here. Even then, you'll need to fill the fabric weave of the Solartex with repeated applications of primer paint followed by wet sanding to get a truly smooth finish that's ready to paint.

Most of painting is preparation, and most of preparation is sanding. Make your sanding go faster and easier by having plenty of fresh sandpaper on hand so you can change it often. Start with 80- or 100-grit, then go to 240- or 320-grit, and then finer according to your craftsmanship standards.

Wet sanding is your friend; the water clears the sandpaper and allows it to cut

The plane now has its final color coat of nearly white paint, and the canopy rails are marked with a combination of frisket and vinyl tape, ready for airbrushing the canopy marking color.



My Focke-Wulf has a molded-fiberglass fuselage and foam-core wings sheeted with balsa and covered with Solartex. I painted it and added panel lines, but I haven't applied the airbrushed weathering yet.



The underside of my F6F Hellcat shows how good panel lines and weathering look on the scale white paint. These markings make the model much more visible in the air. Wheel and tire markings are masked and airbrushed; the insignia and "19" are cut vinyl lettering.

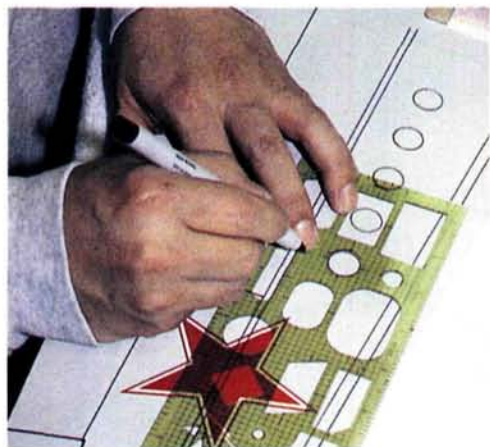
much longer. You'll go through several rounds of primer paint, fill pinholes, sand off most of the primer, let it dry, and prime it again. When you're satisfied with the smoothness of the surface, apply a final light coat of primer and do the last wet sanding round with very light pressure. Here's where the 400- and 600-grit paper will make a difference.

When the water dries, you're ready for the final color coat. Look in the hardware store for spray-paint colors and in the hobby shop for Testors Model Master spray cans, which come in many basic and several military colors. (If you need other colors, you'll need to use an airbrush, and that's another how-to article.) Many markings, such as those on wingtips, rudders and canopies, have to be masked and then sprayed. Vinyl tape works better than paper masking tape for me; it provides a consistently clean edge line, peels off cleanly and easily and can easily be cut to the needed width with scissors. After you mask off the area to be painted, remember to cover the remainder of the plane with paper or rags. Brown paper works better than newspaper (newspaper ink can rub off on the model).

PANEL LINES

Aircraft tend to collect dirt in the joints between panels; this is what

I draw panel lines with a Sanford Sharpie Ultra-fine permanent marker, using various straightedges and templates. Thin plastic rulers and templates conform easily to the curved surfaces on the model.

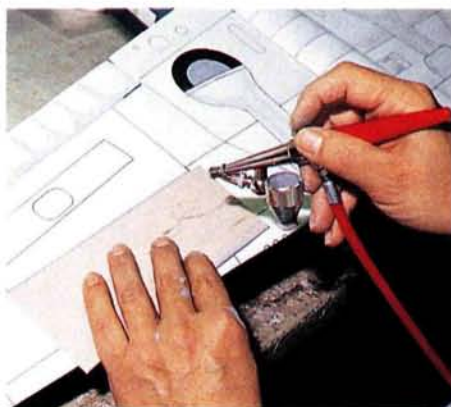


Panel lines on the Kingcobra and the tools of the trade: soft cloth to support the parts, plastic rulers, templates, square, tape to hold ruler and templates in place while drawing, pencil, eraser, Sharpie marker and documentation book.

makes the panel lines visible on full-size planes. Drawing lines on the final painted surface simulates these lines and adds eye-catching detail to the surface of a model.

To find sources of panel-line drawings, check reference materials like the Squadron/Signal "In Action" series of books and photographs from Bob Bank's Scale Aircraft Documentation. The color paintings in the Squadron/Signal books and Bob Bank's photographs will give you ideas for color schemes and for weathering.

Choose a pen that you're comfortable using; maybe technical drafting pens if you have them and like using them. My favorite for convenience is the Sanford Sharpie Ultra Fine Point marker, available at stationary supply stores. The line made by this marker is waterproof, and the ink does not run under the ruler or template, so you can avoid potential smears. Use flexible plastic rulers and flexible plastic drafting templates to guide the marker as you lay down the lines. If your marker gets clogged, wipe it on scrap paper. I'm in the habit of wiping the pen tip before drawing each line on the model. You can correct any small errors you make with the marking pen with alcohol on a paper towel or by carefully scraping off the mark



Above and right: airbrush weathering a Slope Scale model. Gray paint is lightly airbrushed over card mask after the panel lines have been applied. Note the effect of collected dirt on the horizontal stab.



Left to right: P-63 Kingcobra with final paint, panel lines and weathering.



with the point of a hobby knife.

Templates from an art supply store are very helpful. Circle templates will give you just the right size for access panels, and home construction templates have many interesting shapes. Two access panels on my Zeros are grand-piano shapes, possibly not the original Mitsubishi factory shape but interesting to the eye nevertheless. Be sure to hold the ruler or template in a fixed position on the model to get a wiggle-free line. When you draw short lines, you can easily fix the model on the bench with sandbags or other weights. When you draw longer lines, it's useful to temporarily tape the ruler or template to the model.

I generally draw a line on one side and immediately draw its mirror-image counterpart on the other wing, stab, or other side of the fuselage. This speeds my work, because once I've decided the position of a line or shape, going directly to the other side saves me from recalculating all the positions of lines and shapes.

If your plane has a dark finish and you want light-colored panel lines, spray the model with a silver paint undercoat before you apply the final color coat; when all the paint has dried, scratch through the color coat to let the silver panel lines show through.



HOW TO FINISH AND DETAIL FIBERGLASS MODELS

AIRBRUSHED WEATHERING

Dirt from the atmosphere, leaking oil, engine exhaust and gun smoke leave distinctive patterns on real-world airplanes, generally downstream in the airflow surrounding the plane in flight. We simulate the dirt collection and weathering with the airbrush, making use of its wonderful ability to precisely apply small amounts of paint. The general idea is to add just a hint of slightly darker color to the areas of the plane where dirt would tend to collect. One easy way to apply this "dirt" is to hold a card as a mask while airbrushing. Hold the card along the panel line, and spray over the card. For more complicated shapes, use a frisket mask or masking tape.

On my Slope Scale P-63 Kingcobra, I used neutral gray paint, thinned 50 percent, for the weathering effect on panel lines and on the fabric sags of the ailerons and elevators. Some modelers prefer flat black paint thinned 75 percent or more. No matter which color you choose, a light touch on the airbrush gives the best result. Restraint is rewarded here. My application of gray paint on the P-63 Kingcobra shown here is heavier than it needed to be, to make sure it photographed well for this article.

After you've completed the airbrushing, you can add more details with silver paint applied with a nearly dry brush to simulate areas of the plane where paint has chipped off or worn through to the aluminum, such as the leading edges and areas where pilots walk on the wing when entering and exiting the aircraft. Last, give the model an overall light coat of clear lacquer, shiny or matte, according to your preference. I like to use Testors Dulcote in 3-ounce spray cans for this.

Don't be too hard on yourself for little marking or painting mistakes on sport models; it's the overall impression that counts. By spending a little time and working carefully, modelers can improve the appearance of their models with these techniques. Among sport flyers, few would notice that a Zero panel-line layout was applied to a Spitfire, but everyone can tell the difference between a plane with panel lines and one without. ✈

Bob Bank's Scale Aircraft Documentation
(714) 979-8058; bobsairdoc.com.

Testors (800) TESTORS; testors.com.

Vortech Models (626) 458-5578;
geocities.com/vortechmodels.

Slope Scale Models; distributed by Cavazos
Sailplane Design (909) 485-0674;
<http://members.aol.com/rcav/>.

We at PSP Manufacturing are dedicated to producing the highest quality parts you can buy anywhere. Pictured Below are just a few of our fine products.



Engine Break-In Stand
& Mounting Pole.



Fuel (Filler) Dots
& Hi Flow Tees.



Sealed Fuel Cap &
Billet Tool Holders.

PSP Manufacturing
420 Carrol Ann Ln. Ossian IN 46777
219-622-6566 219-622-6679 Fax
866-622-6566 Toll Free

Come visit us on the web.

Back Pack Gas

55" Parachute, 15 size
Complete Kit with engine
and radio \$319.95
Basic Kit \$149.95

1/3 Scale Electric

Complete Kit \$389.00
Conversion Kit \$99.95
Extra 9.6 volt battery \$27.95

This is the same high quality unit as our gas version. Flight Time 7-9 minutes.

1/3 Scale Gas

120" Parachute, 60 size
Call for complete kit with
engine and radio price.
Basic Kit \$456.95

1/3 Scale Gas

52" Parachute, 15 size
Complete Kit with engine
and radio \$339.00
Basic Kit \$159.00

1/4 Scale Gas

88" Parachute, 40 size
Complete Kit with engine
and radio \$445.95
Basic Kit \$219.95

1/2 Scale Gas

180" Parachute
120 size or larger
Call for complete kit price.
Basic Kit \$695.95

Commercial Unit

190" Parachute, 110cc
engine, 40-60 lb. pay load,
JR8103 radio.
Ready to Fly \$4995.00
This unit shipped via truck line

All of our machines are built with the same high quality materials. Wood & Aluminum on the pods and Rip Stop Nylon Chutes. The kits are designed for durability and hours of easy flying.

Video Available (35 min.) \$9.95

You can buy direct from the manufacturer to keep the price down! (Teach yourself to fly!)

AirFoil Aviation, Inc.
1418 N. 2575 PL
Loraine, IL 62349
217-938-4473
Fax 217-938-4373

Visit our website for new products
www.airfoilaviation.com

*A .25-size,
between-
the-wars
attack-
bomber*



THE NORTHROP A-17



This .25-size Northrop A-17 is a seldom-modeled, "between-the-wars" design that's sure to garner attention. You can build it with and without retractable landing gear.



by Frank B. Baker

I decided to build my first .25-size retract-equipped model when Spring Air Products came out with its .25- to .40-size retract set. I chose the Northrop A-17A because I liked its lines, and its gear only partially retracted into the wing; that simplified its wing construction. I scaled up my plan from Wylam drawings that appeared in the December 1943 issue of *Model Airplane News*.

SPECIFICATIONS

MODEL: Northrop A-17

TYPE: sport-scale attack bomber

WINGSPAN: 54 in.

WING AREA: 450 sq. in.

WEIGHT: 4 lb.

WING LOADING: 20 oz./sq. ft.

ENGINE USED: O.S. .25FP 2-stroke

RADIO REQ'D: 4 or 5 channels (rudder, aileron, throttle and elevator); retracts optional

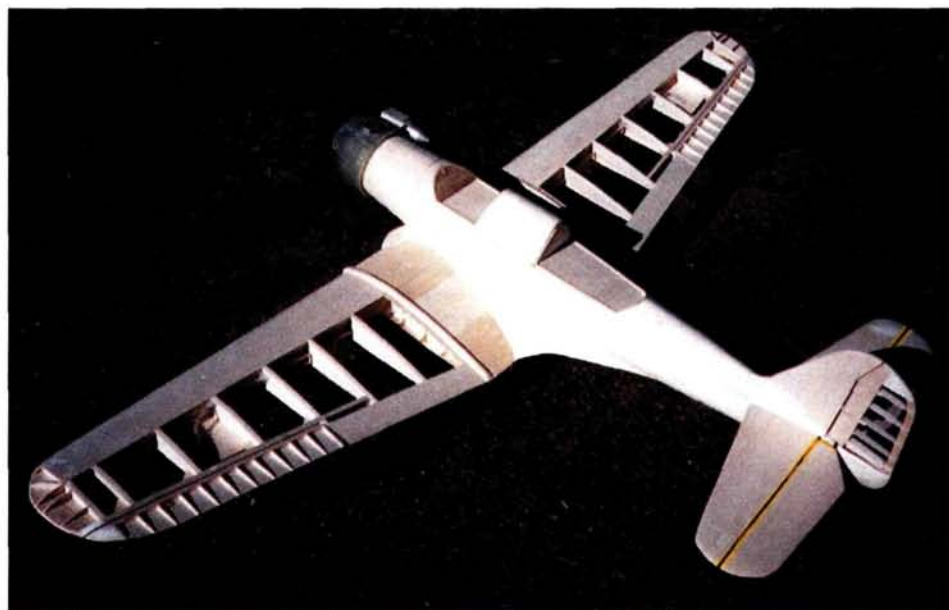
RADIO USED: Hitec micro 555 receiver, 4 Hitec 225 servos and 1 CS 21 sub-microservo

RETRACTS USED: Spring Air .25-size

COMMENTS: the Northrop A-17 designed by Frank B. Baker is a .25-size sport-scale attack bomber from between the world wars. It uses traditional balsa and plywood construction and can be built with and without retractable landing gear. The prototype was covered with EconoKote and has a homemade fiberglass cowl and canopies made of flat sheets of acetate.

CONSTRUCTION

Build the wing's center section first. Assemble the center-section ribs, leading edge, spars and trailing edge, and then saw a $\frac{1}{16}$ -inch vertical slot into the ribs just behind the spars. Remove the rear half of the assembly, and glue the plywood dihedral brace to the spars and front rib sections. Glue the rear section to the brace, and check its alignment for any



The complete A-17 ready to be covered is an impressive sight. Note that the engine cowl is made of fiberglass cloth.

twist. Sheet the top surface, and then install the hardwood landing-gear-support rails. Install the retract units and wheels (I used Williams Bros. smooth contour wheels). Cut slots into the bottoms of ribs 2 and 3 to clear the landing-gear strut, and then trim material from the leading edge and from the bottom of rib 2 to clear the wheels. To check the clearances, hook up the air system and retract the gear. Cut and fit a bit until the gear fully retracts without hitting anything. Install the air hoses so they exit the top sheeting next to rib 1 about $\frac{1}{2}$ inch in front of the top wing spar.

Remove the wheels, but leave the strut in

place. Sheet the wing's bottom from the leading edge back to the dihedral brace. Trim the sheeting neatly around the landing-gear retainer and strut. When the glue has dried, slip the wheels back into place, retract the gear and trace the wheels' locations on the bottom sheeting. The wheel-well opening should be about $\frac{3}{16}$ -inch larger than the wheel. Cut away the unwanted balsa, and cycle the gear to ensure that there's sufficient clearance.

Cut away rib 1's center section just behind the main spar, and fit the plywood aileron servo plate into place. For my aileron control, I use Hobby Lobby no. 805 bulk nylon tubing and metal cable. Slip the tubing through the holes in the ribs, and adjust the servo plate (with servo attached) until the output arm and the tubing line up. Glue the plate into place and add some balsa supports at rib 2. Cut a hole in the top sheeting for the servo connector to go through, remove the nylon tubing and set the center section aside.

FUSELAGE

Cut the fuselage sides from medium $\frac{3}{32}$ -inch balsa, and glue the $\frac{1}{64}$ -inch ply doublers to the inside of each side. Cut out all the formers, and draw vertical and horizontal reference lines on both sides of them. Drill the engine-mounting and the brass gas-tank-tube holes into the firewall.

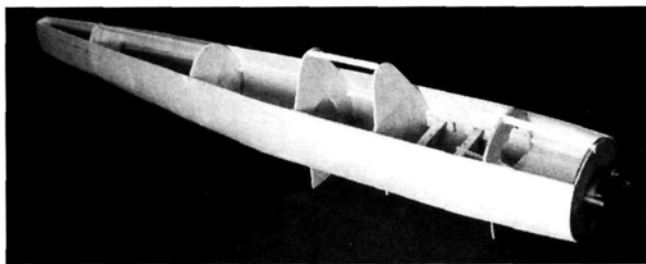
Don't fly the model with an aft center of gravity (CG); instead, start with the CG forward of the mark, and adjust it to your liking after a few test flights. On the first flight, I found that the A-17 was tail heavy, and I decided to replace the solid balsa elevator with the built-up one shown on the plan. This did not cure the tail heaviness, so I attached a brass plate to the engine mount. I soldered lead onto the plate until the model flew nicely. The proper CG is shown on the plan. When the balance had been worked out, the A-17 flew beautifully.

Takeoffs are very smooth, and I usually follow them with a low pass down the flightline so I can watch the gear retract. With a .25-size engine in the nose, the model can loop and roll with ease. With the landing gear retracted, the model has a very slim profile, but the color scheme is quite dramatic against the sky. I have had no problem seeing the model when I fly it.

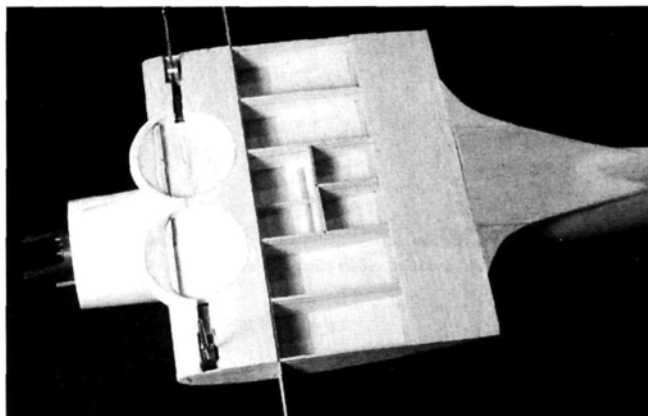
For landings, I use a standard rectangular pattern, as per full scale, but flown close in. I find it easier to see that the gear is down if it is dropped on the downwind leg. Once the gear is down, the throttle is pulled back slightly, and the turn to base leg is initiated. On this leg, the throttle is pulled back to about $\frac{3}{4}$. After a short base leg, turn to final is initiated, and when the A-17 is on final approach, the throttle is reduced to high idle. Over the runway, the

throttle is pulled to full idle, and the A-17 is allowed to glide; with that big wing, it does so nicely. A foot or so off the ground, give enough up-elevator to put the A-17 in the level-flight position. As the speed bleeds off, this results in a nice wheel landing.

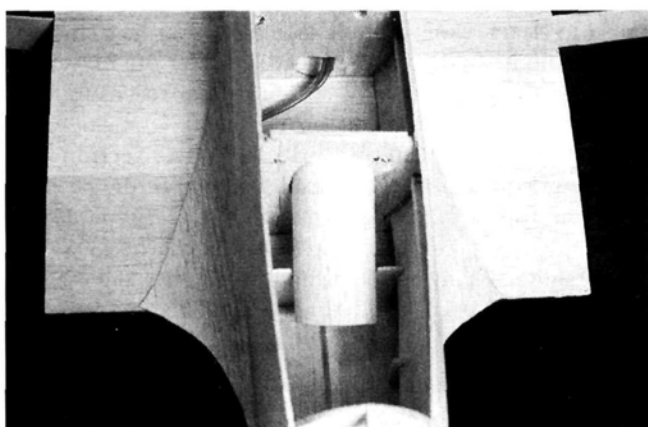




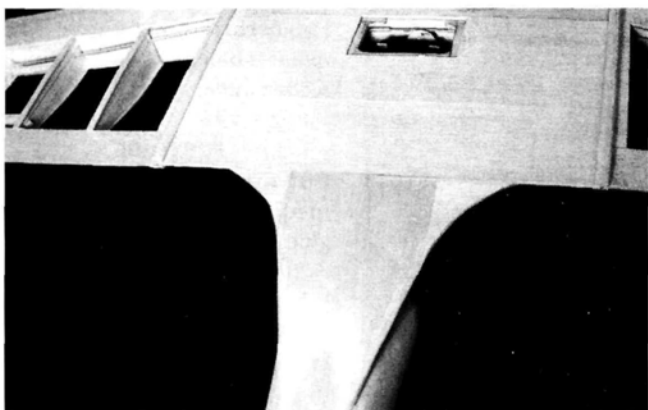
The fuselage sides are built around the formers to shape the main structure. Use the top and bottom stringers to check the framework's straightness.



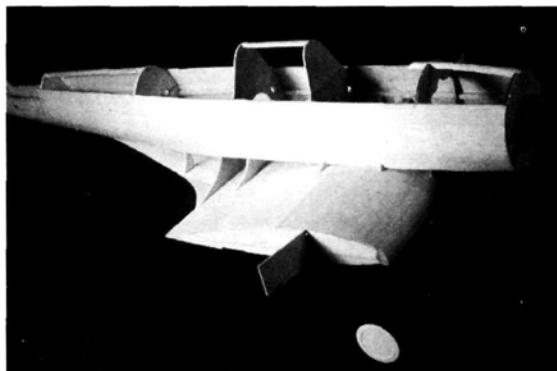
Construction begins by building the wing center section, which is later attached to the fuselage. Note the retractable landing-gear units that are already installed. The fronts of the wheel wells are formed with carved blocks glued to the leading edge.



This balsa tube houses the retract system's air tank. Install the tube after you attach the wing to the fuselage so it will not interfere with the top of the wing.



A major feature of the A-17 is its flowing wing-to-fuselage fillet. The top and bottom surfaces are made with 1/16-inch balsa sheeting supported internally.



When the main fuselage structure has been assembled, attach it to the wing center section. Tabs on the bottom of the fuselage formers key into slots in the top wing sheeting. Measure the wing's alignment before you glue the two structures together.

Attach the mount with the screw threads facing forward. Align the screw-head slots (on the inside of the firewall), and solder a length of music wire across each pair of screws so they won't rotate as you tighten the nuts. Use formers 1 through 7 to build the main fuselage framework. Use the four, 3/16-inch-square stringers as reference lines, and sight down their lengths to ensure that the fuselage is straight.

Pin and glue the fuselage sides to the framework from formers 1 through 4, and then pull the sides together at former 7. Make sure that the sides meet properly at the tail and that nothing is twisted. Let the glue dry before you attach the sides to formers 5 through 7. After the glue has dried, glue former 5A into place. Slide the tank into position, and check that its brass tubes fit through the firewall holes. Install the servo rails so they fit your servos. I used Hitec HS 225 servos. Wrap the retract air tank with 3/32-inch-thick foam and with 1/16-inch sheet-balsa to form a tube. Slip the tube through the opening in former 4, but don't glue it into place.

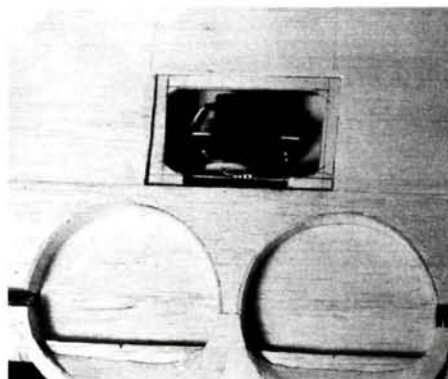
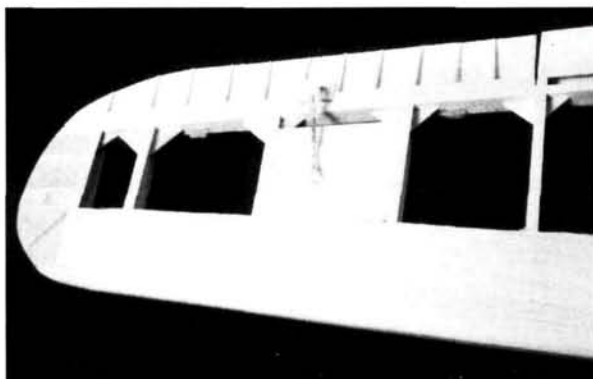
Cut slots in the wing's center section sheeting to fit the stubs that protrude below formers 2, 3 and 4.

Slip the center section onto the stubs and measure the wing's incidence at the leading and trailing edges. You may have to trim the bottom of formers 2 and 4 to achieve the proper angle. Make sure that the wing is perpendicular to the fuselage's centerline. When the center section fits properly, glue it to the stubs, and check the incidence and alignment again before the glue sets.

Glue into place the balsa block that forms the fuselage bottom between formers 1 and 2, and carve it to shape. Also carve the oil cooler, and glue it to the bottom of the fuselage. Shape the two balsa blocks that form the wheel well's front sections, and fit them to the fuselage sides. I used a Moto-tool to carve the blocks until the wheels fit properly, and then I sanded them smooth and glued them to the wing. Use scrap balsa to fill any gaps, and then line the wheel wells with 1/16-inch vertical-grain balsa sheet.

EMPENNAGE

The model's nose moment is fairly short, so build the tail surfaces as light as possible without sacrificing the necessary strength. The fin and rudder use 1/16x3/8-inch ribs that are sanded to a symmetrical shape after you build the structure. The rudder hinge line is offset from the leading edge, and the top two hinges are made from 1/8-inch plywood. I used a piece of 1/16-inch music wire to drill through the top of the rudder at the hinge line. I then cut slots in the trailing edge of the fin post and the leading edge of the rudder to accept ply hinge pieces. Slide a length of music wire down through the rudder and through the plywood hinges. When everything is aligned, glue the plywood pieces into the fin. Sheet the fin and the rudder with 1/32-inch balsa as shown on the plan. When the glue is dry, cut away the balsa at the rudder hinge slots so that the rudder can pivot. Make the lower rudder hinge out of 0.010-inch brass shim stock as shown on the plan. Make the tailwheel strut out of 1/16-inch music wire, insert the hinge into



Left: here's the completed outer wing panel and aileron. Steel cable and plastic tubing make up the aileron-control system. Right: the aileron servo is accessible through a hatch in the bottom wing sheeting. Note the wing fairing just outboard of the retract units.

a slot cut into the rudder, and epoxy it into place. Install a small Goldberg control horn on the right side of the rudder and then glue soft $\frac{1}{2}$ -inch-thick balsa on both sides of the rudder as shown, and carve it to shape later.

The stabilizer ribs are made of $\frac{1}{16} \times \frac{1}{4}$ -inch balsa strips, and the elevator uses $\frac{1}{16} \times \frac{5}{16}$ -inch ribs sanded to shape. Pass $\frac{3}{32}$ -inch music wire through the fuselage to join the two elevator halves. Glue a piece of $\frac{1}{16}$ -inch plywood to the left inboard side of the elevator, and install a small Goldberg control horn. Then sheet the top and bottom of the stabilizer with $\frac{1}{32}$ -inch balsa.

Cut out an opening in the fuselage side to accept the stabilizer/elevator assembly, and glue it into place. Cut a slot in former 7 to accept the shim stock rudder hinge and

then glue on the fin and rudder assemblies. Use some soft balsa to fill in the fuselage between the elevator and the vertical fin from former 6 to former 7. Install the rudder and elevator servos, and make and install the pushrods.

FINISHING THE FUSELAGE

Install the throttle servo, and then install the throttle cable and tubing through formers 1 and 2. Install the engine, and then check the linkage operation. Cut off the upper sections of formers 3 and 4 so they're even with the top of the fuselage sides. From former 2 to 4, fit cross-grain, $\frac{3}{32}$ -inch sheet balsa across the top, but do not glue it down. Install formers 2A and 2B, and then glue formers 3 and 4 to the hatch floor and sheet the area from former 3 to 4. Glue in the $\frac{3}{32}$ -inch floor that goes from former 4A

to former 5. Install former 4A but make sure that it does not get glued to former 4. Sheet the front top of the fuselage from former 1 to former 2B with $\frac{3}{32}$ -inch balsa. Cut through the sheeting between formers 2 and 2A with a razor blade, and lift off the hatch. Glue $\frac{1}{8}$ -inch-square spruce strips to the bottom of the hatch floor so they are a tight fit to the fuselage sides. Also glue $\frac{1}{8} \times \frac{1}{4}$ -inch cross-strips between the hatch rails. Use gray paint on formers 2B, 3 and 4A and on the pilot and gunner compartment floors. Use

lightweight $\frac{3}{32}$ -inch balsa to sheet from the rear turtle deck forward to where the rear canopy meets the fuselage sides.

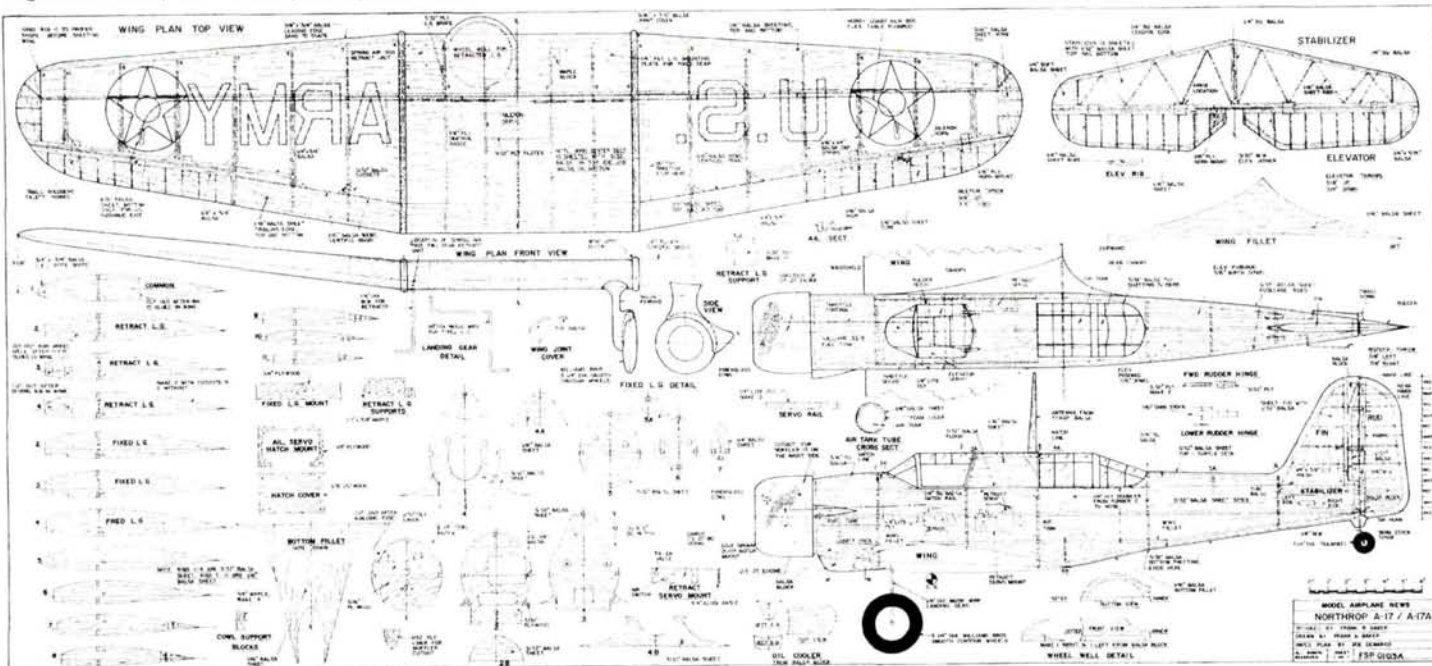
Now sheet the fuselage bottom, and carve the blocks on the sides of the rudder to conform to the fuselage. Glue former 4B on top of the wing's trailing edge, and also glue the bottom stringer's end $\frac{1}{16}$ inch above the bottom of the wing. Then glue in the fillet supports and glue the bottom of the wing fillet into place (note that it extends rearward beyond former 5 and ends just above the fuselage bottom). Cut the top wing fillet's sheeting out of $\frac{1}{16}$ -inch balsa; to make it easier to bend, soak it in a solution of water and ammonia. Trim the sheeting to fit. The fillet top should be parallel to the top fuselage edge. The fillet should extend from the wing's trailing edge to just beyond the end of former 4B and

The Northrop A-17 FSP0103A

Designed by Frank B. Baker, the 25-size Northrop A-17 is a sport-scale attack bomber from between the world wars. It uses traditional balsa and plywood construction and can be built with and without retractable landing gear. The prototype was covered with Econokote and has a homemade fiberglass cowl and canopies made of flat sheets of acetate. WS: 54 in.; engine: .25 2-stroke; 4 or 5 channels; 1 sheet; LD 2. \$19.95

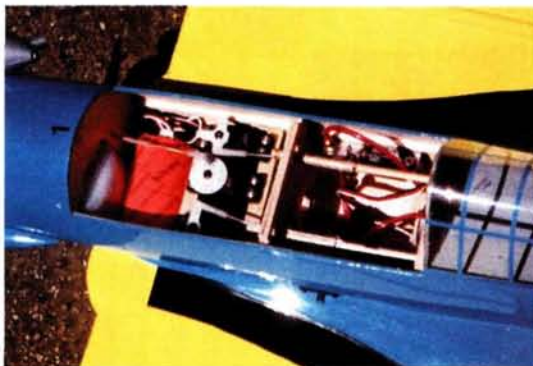
click trip
MODEL AIRPLANE NEWS.COM

FOR COMPLETE
BUILDING
INSTRUCTIONS.





Left: to make room for the stock muffler, some material is removed from the edge of the firewall, and some fuselage sheeting is cut away and capped with thin plywood sheet. **Right:** with the top fuselage hatch removed, the radio compartment is easy to work in, even with the wing still attached to the fuselage.



then form a tight joint with the bottom fillet. Glue balsa scraps into any gaps between the fairing and the wheel-well blocks, and carve the scraps to obtain a smooth transition to the wheel wells.

Slide the air tank into the balsa tube, and then slide it into the opening in former 4, down past former 4B. Pull out the tank, and then glue the tube into place.

Trim a half circle out of the firewall edge, and then trim the fuselage sheeting to provide about 1/8-inch clearance around the muffler. Cover this opening with 1/32-inch ply, and epoxy it into place. After the epoxy has cured, trim away the excess ply to smooth the edges.

FINISHING THE WING

Build the outer panels of the wing, and tilt rib 4 to match the dihedral angle. While the wing is still pinned into place, glue the 1/16-inch vertical-grain balsa web between the lower and upper main spars from rib 5 to rib 10. Don't sheet the front of the wing yet. Cut a vertical 1/16-inch slot in rib 4 behind the spar, slip the outer panel onto the dihedral brace and glue it into place. Make sure that both outer panels have the same dihe-

dral angle; then sheet the top and bottom of the outer wing panels from the leading edge to the rear of the spars. Add the capstrips to all the ribs (see the plan for details).

Install the aileron-control nylon tubing, and add a piece of balsa sheet to support it where it exits the wing between ribs 8 and 9. Slip the control cable into the tubing, and make certain that it moves easily. Install the aileron servo, hold the ailerons in a neutral position, and then attach the control cable to the servo and control horns. Use clear silicone sealant to glue the tubing to every other rib and to the sheeting between ribs 8 and 9. Now sheet the bottom of the center section.

The full-size A-17 has raised fairings that cover the outer wing panels' attachment points. Cut the fairings' leading edges out of 3/8-inch sheet, and make the rest of the fairings out of strips of 3/16x3/8-inch balsa. Sand them to half-round cross-sections, and then glue them over the wing joints.

COVERING AND FINISH

I covered my model with sky-blue and yellow EconoKote, and I made the wing insignias out of insignia blue, white and red

trim sheet. I used black trim sheet for the words "U.S. ARMY" and the wing walks.

Make the canopies out of 0.015-inch acetate sheet. Cut the straight sections of the pilot and gunner compartments over-size, and drape the acetate over the sheeted area between the hatch formers. Use a heat gun to soften the acetate until it conforms to the balsa. Bend and trim the windscreen and the back of the gunner compartment to fit, and then glue them into place. Make the framework out of strips of the sky-blue film, and attach them as shown on the plan.

Make the engine cowl out of three layers of medium fiberglass cloth and HobbyPox no. 2 resin formed over a block of laminated balsa or foam. Cover the form with stretchy plastic wrap, and hold the cloth and resin in place until they have cured by deflating a toy balloon over the mold. Attach the cowl to the model with no. 4 (3/8-inch) sheet-metal screws screwed into support blocks that are epoxied to the firewall. Paint the cowl to match the covering, and fuelproof the engine compartment with thinned epoxy glue.

Assemble the model, and check the radio system to make sure that everything operates properly. Balance the model as shown on the plan, and head for the flying field. The Northrop A-17A is an attractive, seldom-modeled aircraft that's sure to attract attention whenever you fly it. Have fun! ✈

Carl Goldberg Products (773) 626-9550; carlgoldbergproducts.com.

EconoKote; distributed by Great Planes Model Distributors.

Great Planes Model Distributors (800) 682-8948; greatplanes.com.

Hitec RCD Inc. (858) 748-8440; hitecrad.com.

Hobby Lobby Intl. (615) 373-1444;

hobby-lobby.com.

Hobby Pox (973) 625-3100.

O.S.; distributed by Great Planes; osengines.com.

Spring Air Products (407) 728-9002.

Williams Bros. Inc. (805) 534-1307;

williamsbrosinc.com.



Left: the Northrop A-17 attack bomber was originally equipped with a 750hp engine and fixed landing gear. **Right:** the final variant of the A-17, the DB-8A3P, had a 1,200hp engine and retractable landing gear, and it was exported to several foreign countries. This photo shows an 8A-3P in a natural metal finish with Peruvian Air Force markings.



A-17 HISTORY

The Northrop A-17 attack bomber was one of the first all-metal aircraft acquired by the U.S. Army Air Corps. The Northrop division of Douglas Aircraft won a contract for 110 aircraft in December 1934

and began delivery in 1936. The A-17 had fixed landing gear and a 750hp Pratt and Whitney engine. When retractable landing gear and an 825hp Pratt and Whitney engine were added, the aircraft had a top speed of 220mph and was designated the A-17A. One hundred more A-17As were ordered, but only two squadrons used them. Two A-17As were modified to three-seat, unarmed staff

transports and were then called A-17AS's. Although they were advanced designs when they were conceived, by 1939, they had become obsolete.

Many A-17As were exported to France, Holland, Peru, Argentina and Norway. Taking over France's order, the RAF called the A-17A "Nomad." Thirty-two "A" versions were sent to Canada for pilot-training programs. The final version of the aircraft had a 1,200hp engine and was designated the DB-8A. The A-17 was very attractive and was reportedly a delight to fly. The U.S. Air Force Museum has an A-17A on display.

Repair control surfaces

10 steps to look like new!

by John Reid

Damage to the control surfaces of an airplane—especially the tail feathers—is fairly common because they are often bumped during a bad landing or when you transport the plane to the flying field. Here's how I repaired my Prince America Corp. Tucano's damaged rudder; you could easily use this method to repair ailerons and elevator control surfaces as well.



PHOTOS BY JOHN REID



1 I evaluated the plane at the flying field and decided not to separate the rudder from the rest of the plane; I didn't want to risk losing parts that I might need to fix it. I carefully packed the plane in the car and brought it back to the shop for repairs.

I started by disconnecting the control horn and pulling the rudder from the fin and fuselage. I had to break more of the rudder to separate it, but by being careful, I kept the damage to a minimum. Here, the parts are laid out so I could figure out how they would all fit back together.



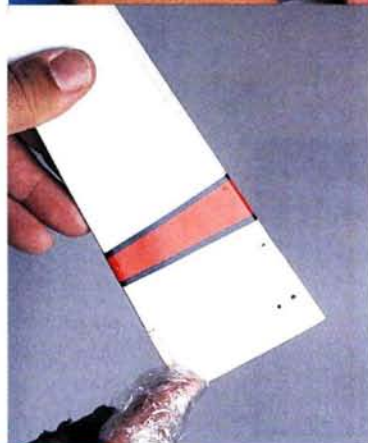
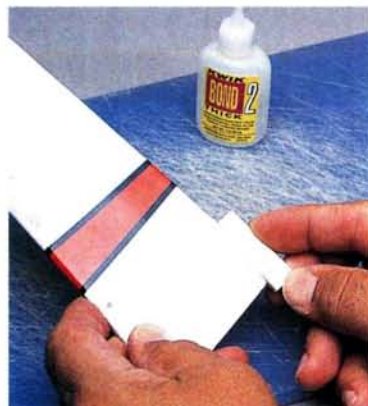
2 All the parts must be cleaned to prevent any gas or oil from seeping into the raw wood. I used rubbing alcohol, but any cleaner that doesn't leave a residue will work.



3 From my layout, I determined that the small pieces had to be assembled first to fit back into the rest of the rudder. Once everything lined up properly, I applied pressure until everything fit back into place, and then I applied thin CA to the joint.



4 I used a lightweight filler in all of the joints, cracks and holes. Because the trim area wasn't damaged, I avoided filling and sanding it so that I wouldn't have to repaint it.



5 & 6 The accident broke a small piece off the bottom of the rudder. I used a hobby knife to trim the jagged edge and then glued a small piece of balsa to it. I trimmed the balsa piece roughly to shape and then smoothed it with a sanding block. I was careful not to sand off any of the trim paint. I filled in the balsa grain with thick CA to provide a nice, smooth surface for the paint. With plastic wrapped around my finger, I was able to rub the CA into the wood without my finger becoming stuck.



7 I test-fitted the rudder to the tail to make sure everything would go together well, and I found that I needed to recut the hinge slots. I could have done that after painting, but now, if I made a bad cut on the rudder, it would just be a simple matter of filling and sanding to repair it.



8 Matching the color is the hardest part of repairing a damaged plane. The orange on the trim would be very hard to match, and so far, I had avoided damaging that area with my filling and sanding. I used electrical tape to protect the trim color as I repainted the rudder. Fortunately, the damaged area was white, so it was easy to find a matching fuelproof paint. After applying my last coat of paint, I waited 24 hours before I removed the tape.



9 Once the paint had dried, the rudder was ready to be reinstalled on the plane. I protected the hinge knuckles with petroleum jelly to prevent any glue from sticking to them and hindering their movement. I coated the hinge surfaces with 30-minute epoxy and attached the rudder to the fin.



10 After just three relaxing evenings in the shop, my Tucano looks as good as new. No one would ever know that its rudder had been so badly damaged. It's time to fly again! ✈

Prince America Corp.
(712) 364-4487;
princeamerica.com.

VERTICAL RC.COM

A New Generation in Electric Aerobat's

32" Speed 280 Katana and Cap 232

7+ minute flights with full aerobatics

PreMolded features reduce assembly to just 3 hours



Has your flight time been Going down with the Sun?
Not Anymore....

Phone 866.674.1006
e-mail: sales@verticalrc.com

Solving engine vibration

This month's column answers questions that concern engine vibration and crankshaft balancing, engine disassembly and how to set up an O.S. .61 SF-P engine without instructions. If you want your questions about engines and/or their related systems answered here, please write to me care of *Model Airplane News* at 100 East Ridge, Ridgefield, CT 06877-4606 USA, or email man@airage.com.

BALANCING SINGLE-CYLINDER ENGINES

Patrick W. Moore of Spokane, WA, writes, "I'm looking for information on how to balance a single-cylinder engine. I believe this involves weighing the big end/small end of the connecting rod [along with] the piston, wristpin, etc., and calculating how much and where to grind material from the crankshaft."

Patrick, numerous formulas have been developed for balancing the single-cylinder engine, but all contain a flaw: single-cylinder

a way. "If you balance all of the conrod and wristpin weight and $\frac{1}{4}$ to $\frac{1}{3}$ of the piston weight, you will be pretty darn close to having an engine run as smoothly as is possible." From this point, Clarence suggests that you add or remove weight from the crankshaft counterbalance by trial and error to discover the smoothest run within a given rpm range.

There are many variables associated with balancing an engine: stroke/bore ratio, rod length/stroke ratio, piston weight and the engine's primary operating speed range. Engine designers know that an engine's piston/wristpin weight must be kept as low as is structurally possible to reduce the inertia loads that increase by the square of shaft speed. Stated another way, if you double the engine's shaft speed, the reciprocating inertia forces increase four times ($2^2 = 4$). In general, short-stroke engine designs run more smoothly than their long-stroke, low-rpm counterparts.

Balancing can be performed on the crankshaft as it is supported by a homemade razor-blade balancer (see illustration).

Hang the conrod on its own crankpin balanced by the wristpin, and decide which percentage of piston weight (slide flat washers onto the wristpin) you will start with.

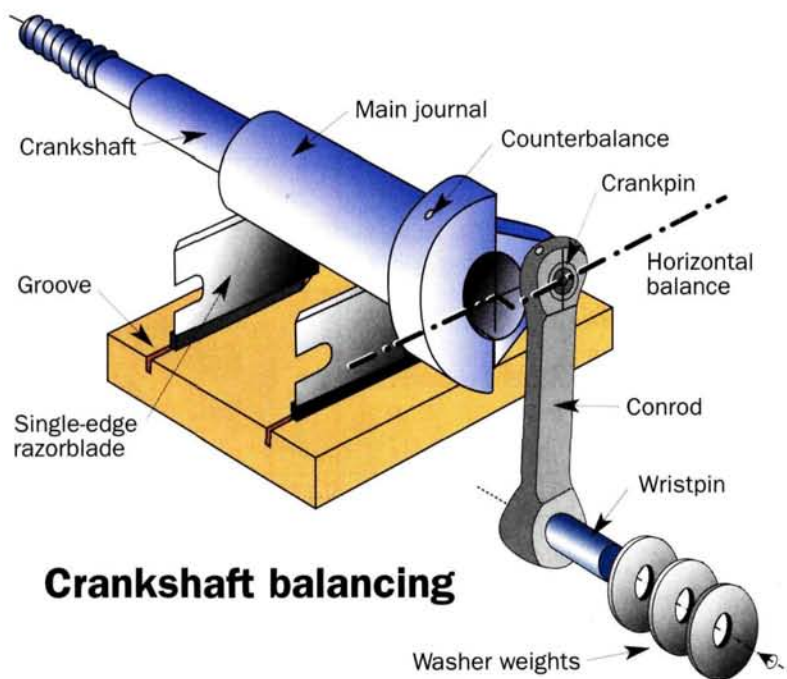
If you determine that the crank's counterbalance is too light, how can you add weight? If the crank's counterbalance hasn't been hardened, you can drill it and fill the hole with lead or solder. As I mentioned in my propeller balancing article in the July 2002 issue, you can also externally balance an under-balanced crank. With the piston at top dead center (TDC), position an unbalanced prop heavily end down, adding to the counterbalance weight. Another way to achieve the same end is to add weight to the inside of a spinner backplate and fasten a washer/machine-screw combination into a drilled and tapped hole through the backplate in line with the crank's counterbalance.

All of this seems unscientific, but with careful trial and error experimentation, you can coax most vibrating engines into smoother operation.

UNCOOPERATIVE FOX

Mike Fleck emails, "Can you tell me how to get the wristpin out of the connecting-rod assembly of a Fox .50? The piston doesn't have any wristpin retainers."

Mike, it sounds as if you have an early Fox .50 that has a meehanite (fine-grain, cast-iron) compression ring installed on an aluminum piston that runs inside a steel cylinder sleeve. Fox fastened the wristpin to the piston in a unique way; he drilled a hole through the bottom of the piston's wristpin boss and the wristpin. Fox then pressed a roll pin into place. If you have one of these engines, it's probably impossible to disassemble. If you clean the internal parts, leave this subassembly together. If the assembly needs repair, return it to the factory. Newer versions of



Crankshaft balancing

engines can't be perfectly balanced for all rpm ranges. In other words, if the engine runs smoothly at one speed, it will run roughly at another. Balancing is a compromise, at best.

The most commonly used formula suggests that all of the rotating (internal) engine parts and 50 percent of the reciprocating weight (back and forth motion) should be balanced by the crankshaft counterbalance. Because the conrod both rotates and reciprocates, weighing individual ends is a difficult and inaccurate process—especially if you don't have a very accurate scale. Over the years, various methods for weighing rod ends have been suggested, but my old friend Clarence Lee has found

the Fox .50 secure the wristpin to the piston with the more conventional E-clip.

Many modelers become confused when they remove the piston-rod/wristpin subassembly from an engine that has a one-piece crank-case (no removable front housing or upper and lower segments). After the cylinder head and backplate (rear cover) have been taken off, you must first remove the cylinder sleeve and slip the conrod off the crankpin. To dislodge the sleeve, place a soft copper glow-plug washer on top of the piston so that it protrudes less than the thickness of the sleeve into the exhaust port (Photo 1). With a prop securely fastened to the crankshaft, turn the engine over until the washer engages the top of the port; if you lightly turn the prop, the sleeve should lift from the case. If it doesn't, don't force the issue! Instead, apply a few drops of 3-In-One oil (or a similar product) to the piston crown, and a little even heat from a propane torch to the upper crankcase (Photo 2). When the oil begins to smoke, stop heating and try again to turn the prop. In most cases, the sleeve will now slide right out (Photo 3). If it doesn't, send the engine back to the manufacturer for servicing before you damage it. Speaking of damage, never use any tool that's made from a harder material than the engine component you are working on. For example, the copper glow-plug washer is softer than the piston or sleeve material, so if you need to push on the bottom of the sleeve to remove it, a wooden ice-cream stick would be a great tool to use.

SETTING UP A PUMPED ENGINE

Paul Kulsziski emails, "I have a brand-new O.S. .61 SF-P (2-stroke) without instructions, and I'm trying to figure out how to hook this puppy up. From the size of the carb opening, I would say that this machine gulps fuel quickly, so it's unlikely that it will work properly without the pump. I want to install this engine in my new 1/8-scale model. Can you help me?"

Paul, your O.S. .61 SF-P ringed engine is a side-exhaust, front rotary crankshaft-induction unit with a PA-102 fuel-pump system, which includes the O.S. Type 86 special carburetor.

Since pumped engines are more expensive than standard suction-feed engines, what advantages do they offer?

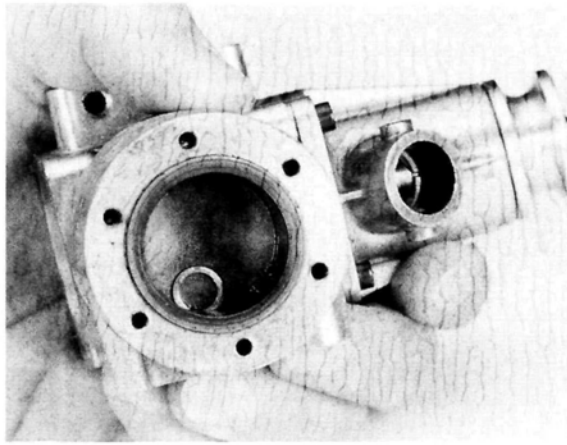


Photo 1. Place the copper glow-plug washer on top of the piston with its edge protruding into the sleeve's exhaust port.

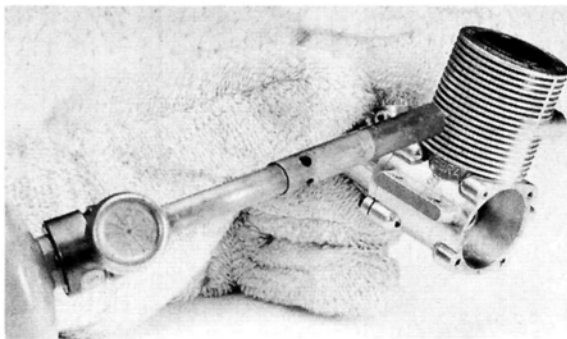


Photo 2. Uniformly heat the upper crankcase with a low flame; hold the engine with an insulated glove (I use High Heat gloves).

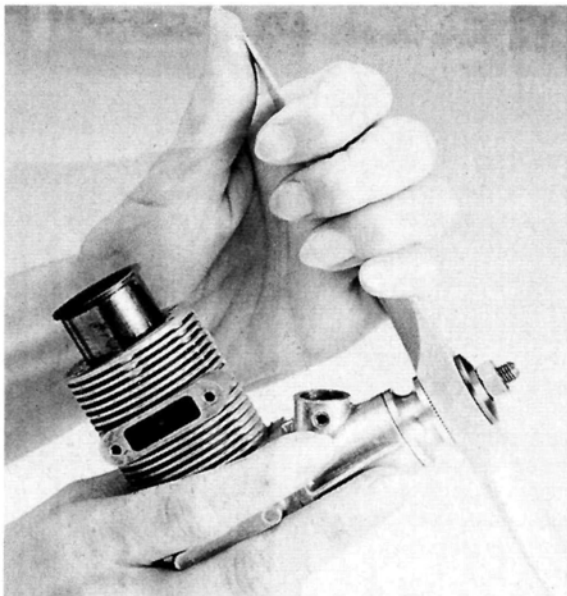


Photo 3. The sleeve as it emerges from the crankcase.

- **Extra power.** Enhanced power delivery throughout the maneuvers, regardless of aircraft attitude or fuel-tank location within the model.

- **Reliable operation.** Regulating fuel pressure during throttling (between wide-open and idle) allows better mixture ratios and throttle reliability.

Although different pump systems have been developed over the years, the O.S. unit operates from positive and negative pressure pulses within the engine's crankcase that act on a diaphragm—similar to the well-known Perry pump system. The O.S. pump is fitted directly into the backplate with components that are sandwiched together. It has aluminum castings, a metal pump diaphragm, a plastic regulator diaphragm, valves, springs and gaskets. It has four inlet and outlet nipples that are labeled on the pump's rear cover: an inlet (in) through which fuel is drawn from the tank; an outlet (out) to deliver fuel to the carburetor's primary needle valve; a return (R) that flows excess fuel back into the tank; and a nipple (S) that connects the pump-regulator chamber to the carb (below the throttle) to sense manifold pressure.

The matching Type 86 carburetor has a massive 12mm bore that is only slightly restricted by a butterfly-type throttle valve (95 square millimeters). In addition to the high-speed needle valve, the carb has an automatic mixture-control valve that ultimately releases fuel to the spraybar at the center of the throttle butterfly. This valve is very easy to adjust by means of an eccentric screw head riding within a yoke. When correctly set for best idle performance, it automatically adjusts the air/fuel ratio throughout the throttle range. There aren't any other adjustments. The pump has two adjusting screws, but these are factory set and sealed; the owner is advised not to fiddle with these or disassemble the pump—under penalty of law! Seriously, if you take it apart, you may never get it back together again; it's that

complex. Two final thoughts; the tank must be vented to the atmosphere and use an in-line fuel filter. †

Fox Mfg. (501) 646-1656, foxmanufacturing.com.

O.S.; distributed by Great Planes Model Distributors (800) 637-7660; osengines.com.

Perry; distributed by Conley Precision (630) 858-3160.

Dawn Patrol over Green Road Sector

On July 7, 2002, the 8th Annual Dawn Patrol Fly In took place at the Northern Connecticut Radio Control Club's 52-acre flying field on Green Road in Ellington, CT. A high cover of smoke from Canadian forest fires made it seem as though the 28 registered pilots and 50 WW I planes were re-creating a Western Front offensive.

Larger aircraft appear to be a growing trend; this year, we counted no less than nine $\frac{1}{3}$ -scale models. Many beautiful smaller aircraft attended, but there is no arguing that the giant-scale models had a



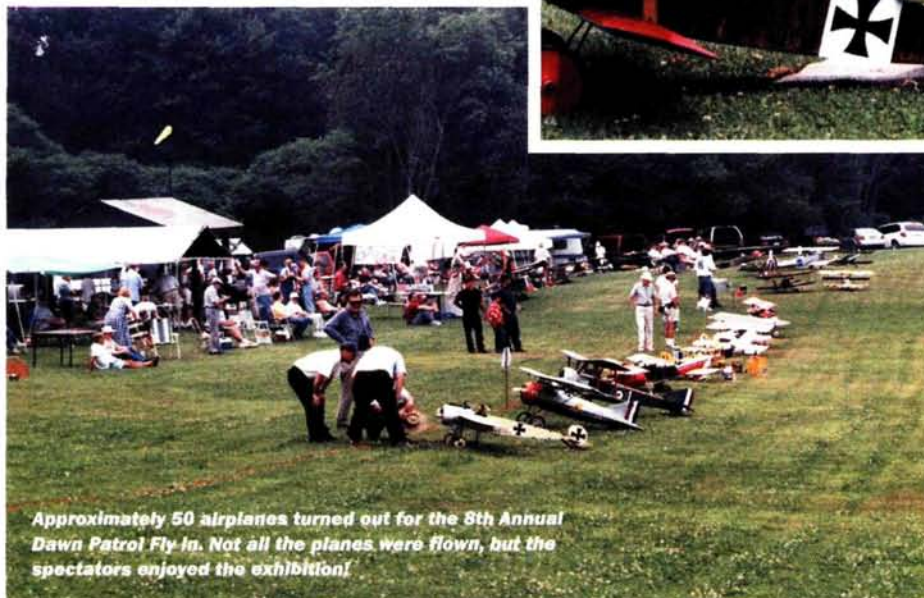
Ken Hall's $\frac{1}{3}$ -scale Fokker D.VIII uses a 65cc John Deere chain-saw engine. Ken's airplane was very enjoyable to watch because he likes to fly it low and slow.



Left: a close-up of Ron Liska's $\frac{1}{4}$ -scale Tiger Moth, just about to lift off. Ron had a lot of nice detail on the airplane. It uses an O.S. 1.08 engine for power.

Below: the model lineup at the 2002 Dawn Patrol event. Of the approximately 50 airplanes on display, nine were $\frac{1}{3}$ scale.

commanding presence and were extremely impressive in slow flight. There were four $\frac{1}{3}$ -scale Sopwith Pups and two Morane Saulniers, all built from Balsa USA kits or plans and powered by Zenoah G-62s, Quadra 50s, Quadra 75s, or Zenoah 445 twins. A master of majestic takeoffs and landings, Mitch Epstein flew a $\frac{1}{3}$ -scale SE5a powered by a Zenoah G-62. Ken Hall had a



Approximately 50 airplanes turned out for the 8th Annual Dawn Patrol Fly-in. Not all the planes were flown, but the spectators enjoyed the exhibition!

2002 Dawn Patrol Sponsors

Arizona Model Aircrafters
Balsa USA
Bob's Aircraft Documentation
Hansen Scale Aviation
Model Airplane News
Northeast Screen Graphics
Old Rhinebeck Aerodrome
R/C Modeler Magazine
Scale Model Research
Williams Brothers
World War I Aeroplanes Inc.

A 1/4-scale 1915 Sopwith Baby built by Julius Greenberger from a John Tanzer plan.



1/3-scale Fokker D.VIII that uses a 65cc John Deere chain-saw motor. Perhaps the most unusual 1/3-scale aircraft was Bob Johnson's beautiful Navy Fleet biplane. The recently completed 36-pound aircraft flew beautifully with a Walker 4.2ci engine.

Though there was plenty of flying to be enjoyed, the pilots and other WW I enthusiasts also had a great time taking photographs and talking to one another about the airplanes they brought, their engines, color schemes and construction techniques.

The next Dawn Patrol Fly In will be held on July 6, 2003. If you like big WW I airplanes, mark your calendar now and plan to attend! The drive to picturesque Ellington is beautiful, and the fly in is a wonderful way to spend a day with like-minded WW I enthusiasts. ✈

—Robert Boulais

For information, check out the club website at www.ncrcc.org.

Right: Bob Johnson's 1/3-scale Navy Fleet biplane weighs 36 pounds and uses a Walker 4.2ci engine. This Fleet is a Navy designation N2Y-1 and is modeled after a prototype in the Pensacola Naval Museum. The Fleet was used as a trainer for the dirigible hook-landing system used on the Airship Akron.



Left: Here, Mitch Epstein—Mr. Majestic—shows his 45-pound SE5a that's powered by a Zenoah G-62 engine. Without a point of reference, it is difficult to appreciate how big a 1/3-scale airplane really is.

Below: a close-up of Ron Brown's 1/3-scale Morane Saulnier A-1 built from a Balsa USA plan. The 40-pound airplane uses a Quadra 75 for power.



Rick Bell changed the character of his Great Planes Tiger Moth by painting it in British camouflage colors.



Graupner

Innovation in the modelling field

www.graupner.com

-Airplanes
-Helicopters
-Boats
-Cars & Trucks
-Accessories



visit us
Graupner

MASTER AIRSCREW

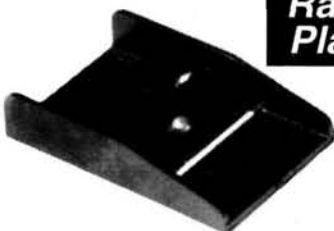
Building Accessories

Balsa Stripper

- Stripwood is easier & more accurate
- 1/32" increment precision cuts
- Uses standard type 11 hobby blade
- Cuts to 1/2" wide and 1/4" thick
- Builder's favorite!
- \$5.95 suggested retail



Razor Plane



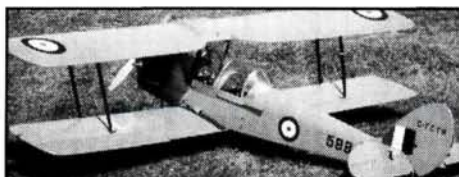
- Rounds and smooths cowlings & fuselages
- Uses heavy-duty cutting blade
- Micro-adjustable cutting depth
- Shape edges & thin strips
- Great companion tool to Balsa Stripper!
- \$5.95 suggested retail

See your local hobby dealer
for our complete line of
propellers and accessories

Send s.a.s.e. for catalog

WINDSOR PROPELLER CO.

3219 Monier Circle
Rancho Cordova, CA 95742
www.masterairscrew.com



Tiger Moth DH82A or C

1/4 Scale Kit with complete hardware package.

\$500 USD (dealer inquiries invited)

- Complete drawings show details of construction
 - Fibreglass cowl & gas tank • Exact 1/4 scale outline
 - Laser cut metal & wood parts • Span 88 inches
- Other kits available: 1/4 scale MK IX & MK XII Spitfire;
Hawker Hurricane MKII available Fall '98.

Send \$4 for info pack and prices. Visa accepted.

Clark Industries

R.R.#4 Tottenham, Ontario, Canada L0G 1W0
Tel/Fax: (905) 936-2131 • www.clarkindustries.on.ca

MODEL AIRPLANE NEWS

CLASSIFIEDS

RATES: non-commercial—25 cents per word (no commercial ads of any kind accepted at this rate); commercial—50 cents per word (applies to retailers, manufacturers, etc.); count all initials, numbers, name and address, city, state, zip code and phone number. **All ads must be paid for in advance.** To run your ad for more than one month, multiply your payment by the number of months you want it to run. Deadline: the 10th day of the month, 3 months in advance, e.g., January 10 for the April issue. We don't furnish box numbers, and it isn't our policy to send tear sheets. Please make all checks payable to: **AIR AGE INC. SEND AD AND PAYMENT TO: CLASSIFIED ADS, Model Airplane News, 100 E. Ridge, Ridgefield, CT 06877-4606 USA, or call (203) 431-9000.**

BUSINESS

RYOBI CONVERSIONS. We are the oldest, the best and the least expensive. For complete engines, conversion kits, or our 360-degree muffler, we have all your conversion needs. For free conversion instructions and catalog, send SASE to Jag Engines, 16073 Muscatel, Hesperia, CA 92345; (760) 244-7270, or see our website at www.jagengines.com. [7/03]

WINGDESIGNER. Windows program designs and prints wing with ribs, spars and sheeting; www.jery.org. [1/03]

ALUMINUM CAN CRAFT PLANS: Build airplanes, vehicles, locomotives and construction equipment. Free list. Tesscar, Box 333A, Scappoose, OR 97056, or www.tesscar-aluminum-craft.com. [6/03]

RC CUSTOM BUILDERS INC. Over 30 years' experience. Specializing in RC aircraft, including sailplanes and helicopters. We will custom build for you, frame up, covered or with radio and motor installed. We will even test-fly it for you at no extra charge. We also build ARFs and offer flight camps and instruction all summer long from April to November. For more information, please contact Mark or Joe at (970) 726-5792. [01/03]

RACEPLANES—SCALE DWGS. Send for brochure listing 370 accurate 6-view scale drawings. Enclose \$3. Also available: Wedell-Williams book, \$19.95, Good Year book, \$24.95, and IF-1 book, \$24.95. Add \$2 to each book for S&H. Author signs books. Raceplanes By Hirsch, 8439 Dale St., Buena Park, CA 90620. [3/03]

RCMODELBUILER@YAHOO.COM. Any kit construction as ARC, rate: \$5/wingspan inch (biplanes, \$7). Return shipping included. Please contact us. [2/03]

FOR SALE: scale plans for a 57-in.-wingspan Westland Lysander. Must structurally build it to suit your needs. For use with high-powered or heavy engines. Plan comes in 29 sections. Approximately 12x3 feet. Price: \$120 in U.S. funds only. Mail and make checks payable to: Lee R.T. Frick, P.O. Box 2201, Murrells Inlet, SC 29576. Please allow 30 to 60 days for delivery. [01/03]

GUARANTEED: the best copies and enlargements—low prices—black ink on large sheets—no fuzzy bluelines, no dozens of sheets taped together—any size or scale from plans or magazines. Build from a copy and save your valuable plans. \$2 for info and customized poster for your shop. Roland Friestad, 2211B 155th St., Cameron, IL 61423. [3/03]

MODEL AIRPLANE NEWS 1952-1980; "Air Trails" 1937-1952, "Young Men" 1952-1956, "American Modeler" 1957-1967, "American Aircraft Modeler" 1968-1975. \$1 for list. George Reith, 3597 Arbutus Dr. N., Cobble Hill, BC, Canada V0R1L1. [4/03]

WARPLANE WINDVANE PLANS! Build amazing scale windvanes! Details: Windm, 520 Hooper Rd., 153, Endwell, NY 13760-1960; www.windm.com. [01/03]

BOB'S AIRCRAFT DOCUMENTATION 2002. World's largest commercial collection of aircraft photos (400,000) and 3-view line drawings (35,000). 256-page catalog, \$8 (Canada, Mexico, Alaska, Hawaii, Puerto Rico—\$10; foreign, \$18; includes postage). 3114 Yukon Ave., Costa Mesa, CA 92626 USA; (714) 979-8058. [01/03]

www.telstarhobbies.com Crash videos! Your online source for RC and full-scale aviation books and videos. (772) 286-2535; sales@telstarhobbies.com. [5/03]

GAS ENGINE CONVERSIONS, KITS AND PARTS. Homelite, Weedeater, Ryobi, McCulloch, Honda. Information, \$5. Visa/MC. Carr Precision, 6040 N. Cutter Cir., #303, Portland, OR 97217; phone/fax (503) 735-9980; www.carrprecision.com; email carrprecision@worldnet.att.net. [01/03]

MODEL AIRPLANE SCHOOL: at Hobbies Aloft R/C Flight School, you will experience more than 100 hands-on landings per day of training until you solo—guaranteed! Ray Smith will be your personal trainer, and using "kinesthetic instruction" (no buddy-boxes), he will guide you down to each landing until you can execute the landing sequence all by yourself. Typical students require 4 to 6 days of training to solo, and then their RC flying fun really begins! We fly year-round on the beautiful California coast near Monterey. Call toll-free, (888) 700-4421 to make a reservation, and please visit our website: www.hobbiesalof.com. [6/03]

HIGH-QUALITY ARFS AND FAST-BUILDING KITS: Sukhoi, Extra 300S, CAP 21, 60 to 90 sizes. Please visit www.vectorflight.com for complete details and secure online ordering. [10/03]

BRIDI RADIO CONTROL: some remaining Bridi kits available. Reasonable prices. Call for prices and information on kits in stock. (310) 326-5013 (evenings); website www.bridiradiocontrol.com. [4/03]

QUARTER-SCALE FLEET MODEL 2 BIPLANE and 1/2 electric fleet kits. Concept Models, 6505 Ulrich Terrace, Madison, WI 53719. SASE for details. www.mailbag.com/users/conceptmodels/. [4/03]

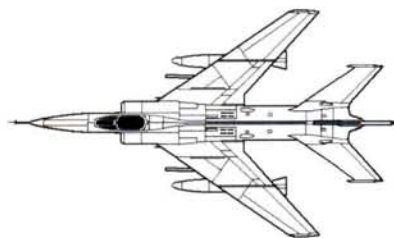
HOBBYIST

MAGAZINE BACK ISSUES: Model Airplane News, RCM, FM. Model and full-scale titles, 1930-1999. Send SASE for list: Carolyn Gierke, 1276 Ransom, Lancaster, NY 14086. [6/03]

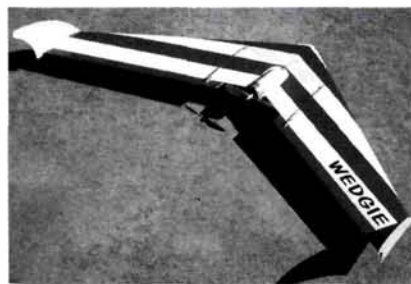
USED ENGINES WANTED: pre-1970 preferred. T. Crouss, 100 Smyrna, West Springfield, MA 01089. [5/03]

WANTED: Ace 4/40 monoplane kit. (262) 241-3348. [1/03]

MODEL MAGAZINES, 1930s ON. Send wants to davidbrown46@cox.net. [11/03]



GOT A... WEDGIE
Speed 400 \$51.95 + \$6S&H

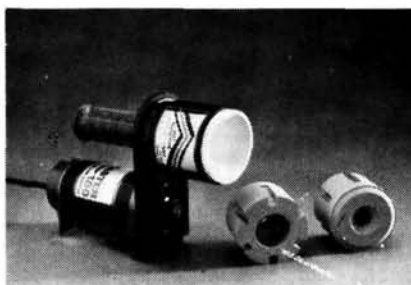


LiL Horner
Park Flyer \$54.95 + \$6S&H



MM Glider Tech
Phone: 562-927-2583
P.O. Box 39098, Downey, CA 90239
E-mail: mmglidrt@keyway.net
http://www.mmglidertech.com

The Persuader
Provides Four Times the Torque!



Miller R/C introduces a belt-reduction assembly designed to start big-block engines—even when cold!

Operating at 1,400 to 1,800rpm, the 4:1 belt-reduction ratio gives you four times more torque, and the system is easy to mount on your starter.

The unit comes with an insert starter cone for spinners, and a Big Tough Grip insert is available for prop nuts.

Fits most high-quality 12V to 24V starters.

Miller R/C Products
P.O. Box 425
Kenwood, CA 95452
(707) 833-5905
Fax (707) 833-0059

ELECTRONICS FOR THE DISCERNING MODELER...

RELIABLE IDLE...NO HASSLE



EDR103 - Still Only \$39.95!

Enjoy **RELIABLE, S-L-O-W** idle **PLUS... EASY, SAFE** Starts!

Single, Twin-cylinders, Twin-engines
NO interference! Works with Rx's
Light! Less than 35 grams
Ultra-simple installation!

Multi-cylinders? Ask for the
EDR-103M Super GlowLite!
3-5 Cylinders - \$79.95/
7 Cylinders - \$94.95

GLITCH-PROOF YOUR AIRPLANE!

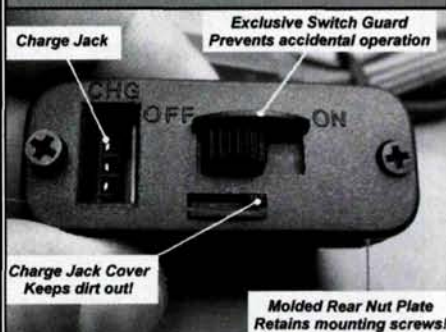


POW'R BUS PRO
EDR-111 \$79.95

OPTICALLY-
COUPLED,
AMPLIFIED
SERVO ISOLATOR

- ♦ Optically isolate Rx & servo power!
- ♦ Uses separate batteries - reliability thru redundancy!
- ♦ Amplified control signal drives
- ♦ Isolate 6 control channels - easily expandable to more channels

Heavy Duty Ultra DSC Switch - \$16.00



ElectroDynamics

31091 Schoolcraft, Livonia, MI 48150

Website: http://www.electrodynamics.com

1-800-337-1638 (Orders)

Info: 1-734-422-5420

Fax: 1-734-422-5338



NAME THAT PLANE

Can you identify this aircraft?

SEND YOUR ANSWER to *Model Airplane News*,
Name that Plane Contest (state issue in which plane appeared),
100 East Ridge, Ridgefield, CT 06877-4606 USA.



The winner will be chosen, four weeks following publication, from correct answers received (delivered by U.S. mail) and will be awarded a free, one-year subscription to *Model Airplane News*. If already a subscriber, the winner will be given a free, one-year subscription extension.



Congratulations to Jerry Amelang, of Tullahoma, TN; he's the winner of November's "Name that Plane." Jerry was one of only a handful of readers who correctly identified the mystery plane as the Ryan PT-25 (ST-4), the last of the Ryan ST series. Built in response to the Army's request to convert the all-metal PT-22 low-wing trainer to non-strategic materials in order to release essential metals for more urgent purposes, this two-seat primary trainer was constructed almost entirely of plastic-bonded wood. Powered by a 185hp Lycoming O-435-1 6-cylinder engine, the 30-foot, 1-inch-wingspan PT-25 was capable of speeds to 134mph. It could be flown solo from either cockpit, which permitted students to fly from the front cockpit, just as they would in any advanced military flyer. Ultimately, the PT-25 failed to enter production. ✈

Unleash the power of Irvine's new .39 series engines deliver maximum power – minimum weight



39 Aero ABC Engine w/muffler

Bore: 0.84 inches
Stroke: 0.71 inches
Weight w/muffler: 13.6 ounces
RPM Range: 2,800 - 18,000 rpm
Horsepower: 1.3 bhp @ 18,000 rpm

Item#IRV4391



39 Heli ABC Engine w/muffler

Bore: 0.84 inches
Stroke: 0.71 inches
Weight w/muffler: 10.6 ounces
RPM Range: 3,000 - 22,000 rpm
Horsepower: 1.4 bhp @ 20,000 rpm

Item#IRV4393

Flying may never be the same.

Irvine breaks new ground with their high performance .39 cubic inch glow engines for R/C airplanes and helicopters. Using state-of-the-art engineering and metallurgy, these new .39's create more power than conventional .40's, yet in a size and weight compared to some .30's.

The Aero .39 tips the horsepower scale at an amazing 1.3 bhp at 18,000 rpm while weighing only 13-1/2 ounces with muffler.

The Heli .39 rocks the world with an outstanding 1.4 bhp at 20,000 rpm, yet weighs less than 11 ounces ready to mount in most .30-size R/C helicopters.

Unleash the power of 9 in your airplane or helicopter. Feel how a smaller engine can perform.

9

IRVINE
ENGINES

Irvine Engines is distributed exclusively by:

SIG Manufacturing Company, Inc.

P.O. Box 520

Montezuma, Iowa 50171-0520

Visit our web site: www.sigmfg.com

DURALITE BATTERIES PLUS

Ask about
our
upgrade.

The Best Just Got Better

Lithium Ion Packs

950 mah 7.4 volt 2 cell	36.95
1400 mah 7.4 volt 2 cell	42.95
1800 mah 7.4 volt 2 cell	48.95
1900* mah 7.4 volt 4 cell	68.95
2800* mah 7.4 volt 4 cell	78.95
3600* mah 7.4 volt 4 cell	88.95

4 output charger 72.95

(*redundant - prices in US\$)

shop on line

www.duraliteplusbatteries.com

phone toll free: 877-744-3685

Visit our web site for full specifications and product line.

Upgrades available for Original Duralite Customers

STATEMENT OF OWNERSHIP

Statement of Ownership, Management, and Circulation (Required by 39 U.S.C. 3685). 1. Title of Publication: MODEL AIRPLANE NEWS. 2. Publication no.: 533-470. 3. Date of Filing: October 1, 2002. 4. Frequency of Issue: Monthly. 5. Number of issues Published Annually: 12. 6. Annual Subscription Price: \$29.95. 7. Complete Mailing Address of Known Office of Publication: 100 East Ridge, Ridgefield, CT 06877-4606. 8. Complete Mailing Address of Headquarters or General Business Office of Publisher: Same. 9. Full Names and Complete Mailing Address of Publisher, Editor, and Managing Editor: Publisher: Louis V. DeFrancesco, 100 East Ridge, Ridgefield, CT 06877. Editor: Thomas Atwood, 100 East Ridge, Ridgefield, CT 06877-4606. Managing Editor: Debra Sharp, 100 East Ridge, Ridgefield, CT 06877-4606. 10. Owners: Louis V. DeFrancesco and Yvonne M. DeFrancesco, 100 East Ridge, Ridgefield, CT 06877-4606. 11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or more of Total Amount of Bonds, Mortgages or Other Securities: None. 12. Does not apply. 13. Publication Name: MODEL AIRPLANE NEWS. 14. Issue Date for Circulation Data Below: October 2002. 15. Extent and Nature of Circulation: Average Number of Copies Each Issue During Preceding 12 Months: A. Total Number of Copies (Net Press Run): 104,875. B. Paid and/or Requested Circulation: (1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541: 51,254 (2) 0 (3) Sales through dealers and carriers, street vendors and counter Sales: 20,217 (4) 0. C. Total Paid and/or Requested Circulation: 71,471. D. Free Distribution by Mail, Samples, Complimentary and Other Free: (1) 1,547 (2) 0 (3) 0. E. Free Distribution outside the Mail: 2,481. F. Total Free Distribution: 4,028. G. Total Distribution: 75,499. H. Copies Not Distributed: 29,376. I. Total: 104,875. Percent Paid and/or Requested Circulation: 94.7%. Actual number of copies of single issue Published Nearest to Filing Date. A. Total Number of Copies (Net Press Run): 104,979. B. Paid and/or Requested Circulation: (1) Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541: 50,703 (2) 0 (3) Sales through dealers and carriers, street vendors and counter Sales: 21,184 (4) 0. C. Total Paid and/or Requested Circulation: 71,887. D. Free Distribution by Mail, Samples, Complimentary and Other Free: (1) 1,434 (2) 0 (3) 0. E. Free Distribution Outside the Mail: 2,102. F. Total Free Distribution: 3,536. G. Total Distribution: 75,423. H. Copies Not Distributed: 29,556. I. Total: 104,979. Percent Paid and/or Requested Circulation: 95.3%. This statement of ownership will be printed in the January 2003 issue of this publication. I certify that the statements made by me above are correct and complete.

Stacey Nelson, Circulation Manager

PAGE AVIATION

1/5th scale Gee Bee Z

Cad Drawn
Laser Cut
Kits



LASER CUT KIT	129.95	57" SPAN	5 3/4 LBS.
OPTIONAL GLASS PANTS	35.00	FOR .20 2 STROKES	
RADIAL ENGINE KIT	10.00	.52 TO .56 4 STROKES	

The NEWBEE



LASER CUT KIT	59.95	40" SPAN	3 LBS.
DECAL SHEET	5.95	FOR .20 2 STROKES	
FLOAT KIT	25.95	TO .30 4 STROKES	

1/5th Scale Gee Bee R2



GEE BEE R2 KIT	139.95	60" SPAN	6 1/2 LBS.
OPTIONAL GLASS PANTS	30.00	FOR .60 2 STROKES	
RADIAL ENGINE KIT	10.00	TO .91 4 STROKES	

www.adrianpage.com

TO ORDER CALL 902-538-7395 (Atlantic time please)



**DA Engines—
The Choice of
Champions!**



DA-150

- Displacement: 9.15 ci. (150cc)
- Output: 16.5 hp
- Weight: 7.96 lbs (3.61 kilos)
- Desert Aircraft auto advance electronic ignition.
- Exclusive Desert Aircraft designed cylinders, pistons and crankshaft.
- Three-piece CNC milled, 2024 T3 aluminum alloy crankcase.
- Long rod to stroke ratio.
- Aerobatic power curve.
- Most torque in its class.
- Two year warranty.

DA-150 Engine: \$1,495.00

DA-150 Muffler Set: \$165.00



DA-100

- Displacement: 6.1 ci. (100cc)
- Output: 9.8 hp
- Weight: 5.8 lbs (2.63 kilos)

DA-100 Engine: \$1,150.00

DA-100 Muffler Set: \$145.00

desertaircraft@theriver.com
www.desertaircraft.com
Phone: 520-722-0607
Fax: 520-722-5622
140 South Camino Seco, Suite# 418
Tucson, AZ 85710-4487

MODEL Airplane NEWS

Customer Service

Thank you for joining the Air Age family of publications where you can explore the exciting worlds of radio control and aviation.

These tips will help you get the most out of your subscription:

How to read your label:

#BXNBNMG *****AUTO** 3-DIGIT 068
#12345ABC123AB12C# AUG 03 MAIR 000



Your account number is
12345ABC123AB12C.

Your expiration date issue is August
2003.

How and when to tell us of an address change

Address changes should be requested before you move. Our labels are printed ahead of time, so please allow 4-6 weeks for the change to take effect. Please include a copy of your current label. Send all address changes to:

Model Airplane News
P.O. Box 428
Mount Morris, IL 61054

You may also contact us via email at
MAIR@kable.com, or fax (815) 734-1223.

Our cancellation policy

All cancellations must be requested in writing. You may send in your request via mail, email, or fax. You will be sent a refund for all unserved issues.

Our renewal policy

Renewal notices are sent six months prior to your expiration date (see label above). You may renew your subscription via mail by sending in your renewal invoice with payment. For faster service, renew online at
www.modelairplanenews.com

The best deal will be in the first renewal notice you receive. By renewing early and for a longer term, you create savings for us, which we pass on to you. So always check your first renewal effort for the lowest price available.

The Flying Razor

Last made full scale by Fokker in 1918;
Recreated in 1/4 scale by GTM in 2002.



Fokker

D8 KIT \$785

GTM

2404 Bane Road
Efland, NC 27243

919-643-1001
gtm@mindspring.com
www.gtmodels.com

Advertisers

- | | | | |
|---------------------------------|----------------------------------|--------------------------------|----------------------------------|
| 1st U.S. R/C Flight School, 168 | D&L Design, 174 | Kangke Industrial USA Inc., 47 | Precision Micro Electronics, 156 |
| 3 Sea Bees, 169 | Doppeldecker, 142 | Kolb Aircraft Co., 146 | Prince America Corp., 61 |
| Ace Hobby Distributors, C4 | Draganfly, 7 | Kyosho, 79 | Propwash, 170 |
| Aerojet Composite Models, 106 | Du-Bro Products, 51 | Landing Products, 132 | PSP Mfg., 167 |
| Aeroloff Designs, 132 | Dumas, 124 | Lanier RC, 1133 | Quantum Models, 108-110 |
| Aero-Model Inc., 56, 57 | Dymond | Lite Machines, 141 | RC Showcase, 154 |
| Aeroscale Products, 170 | Modelsports USA Ltd., 84-85 | LMP Inc., 169 | RCstore.com, 160-162 |
| Aerospace | Dynaflite, 37 | Machine Works, 115 | RC Superstore, 154 |
| Composite Products, 104 | Ebay, 16-17 | Maiden Model Products, 114 | RCV Engines Ltd., 142 |
| Aerotech Models, 158 | Eddie Aircraft, 175 | Markey's, 159 | RTL Fasteners, 154 |
| Aeroworks, 107 | ElectroDynamics, 111 | Markin, 150 | Retop Industries, 168 |
| Airborne Leather, 152 | Esprit Model, 97 | MaxCim Motors, 173 | Richmond RC Supply, 112-113 |
| AirBorne Models, | Eurokit North America, 148 | Maxx Products Intl., 143 | Robart Mfg. Inc., 155 |
| 56-57 | Falcon Trading Co., 101 | Mecoa, 93 | Sherline Products Inc., 139 |
| Airborne Video Systems, 124 | Fiberglass Specialties, 175 | Megatech, 82 | Sig Mfg. Co. Inc., 175 |
| Air Foil Aviation, 124 | Flair, 83 | Micro Fasteners, 173 | Sky Hooks & Rigging, 142 |
| Airtronics, C3 | Flight Journal Special | Micro Pilot, 114 | SKS Videos, 102 |
| America's Hobby Center, 171 | P-51 Mustang, 163 | Midwest Products, 167 | Slimline Products, 10 |
| Autogyro Company | Flight Line Toys, 87 | Miller R/C Products, 114 | SoarSoft, 170 |
| of Arizona, 168 | FMA Direct, 99 | MM GliderTech, 146 | Sonic-Tronics, Inc., 111 |
| Backyard Flyer | Fun/Aero R/C, 167 | Mobile Airships & Blimps, 173 | Speedtech Instruments, 168 |
| subscription, 131 | Futaba, 69, 125 | Model Airplane News | SR Batteries Inc., 174 |
| Batteries America, 127 | G&L, 177 | subscription, 147 | Sullivan Products, 11 |
| Blue Box Toys, 23 | G&P Sales, 148 | Modellbau USA, 88 | T&D Plan Sales, 132 |
| Bob Smith Industries, 53 | Global Hobby Distributors, 3, 12 | Model Machine, 72 | TDL Model Systems, 114 |
| Bold Muffler, 154 | Grand Wing Servos (GWS), | Model Rectifier | Tekoa: The Center of Design, 151 |
| Bruce Tharpe Engineering, 169 | 144-145 | Corp. (MRC), C2, 39 | TNT Enterprises, 146 |
| Bruckner Hobbies, 89 | Great Planes | Morgan Fuel, 126 | Top Flite, 103 |
| C3GM, 169, 175 | Model Mfg. Co., 4-5 | Nelson Hobby Specialties, 173 | Tower Hobbies, |
| C.B. Tatone, 83 | Hacker, 98 | Nick Ziroll Plans, 142 | 134-138, 172 |
| Cactus Aviation, 105 | Hangar 9, 9, 32-33 | Northeast Aerodynamics Inc., | Toytronix, 104, 151 |
| Canterbury Sailplane, 174 | Hayes, 150 | 170 | Trick R/C, 176 |
| Carl Goldberg Products, 23 | Herr Engineering, 146 | Northeast Sailplane Products, | Tru-Turn, 132 |
| Castle Creations, 83 | Hitec RCD Inc., 19, 40-41 | 157 | T Tech Corp., 140 |
| Cermark Electronics, 164-166 | Hobby Horse, 119 | Norvel, 148 | Ultimate RC Flight Guide, 153 |
| Chase-Durrer, 121 | Hobby Lobby Intl., 73 | Omni Models, 117 | Universal Laser Systems, 132 |
| Chief Aircraft, 128-129 | Hobby People, 74-75 | On Top of the World, 158 | Vintage R/C Plans, 124 |
| Clark Industries, 170 | HobbyTown USA, 140 | O.S. Engines, 81 | Voltair Tech, 150 |
| Cleveland Model & | Hobby Zone, 31 | Overland, 124 | White 1 Foundation, 173 |
| Supply Co., 174 | Horizon, 122-123 | Page's Aviation, 168 | Wildcat Fuels, 149 |
| Creek Hobbies, 64-65 | Horrace Cain, 127 | Palmer Plans, 140 | Wildhare, 63 |
| Cross Hobby Tools, 154 | Ikarus, 87 | Paul Guillow, 170 | Williams Bros. Inc., 170 |
| Dave Brown Products, 127 | J&B Access Panels 106 | Peck-Polymers, 154 | Windsor Propeller Co., 104, 174 |
| Dave Patrick Models, 95 | JK Aerotech, 87 | Performance RC Hobbies, 173 | Wingtote, 168 |
| Desert Aircraft, 111 | JR, 21 | Planrite Trading Company, 71 | Yellow Aircraft Intl., 130 |
| DJ Aerotech, 140 | K&B Model Products Inc., 151 | PowerMaster, 150 | Zap, 15 |

MODEL AIRPLANE NEWS (ISSN 0026-7295, USPS 533-470) is published monthly by Air Age Inc., 100 East Ridge, Ridgefield, CT 06877-4606 USA. Copyright 2002; all rights reserved. The contents of this publication may not be reproduced in whole or in part without the consent of the copyright owner. Periodical postage permit paid at Ridgefield, CT, and additional mailing offices.

SUBSCRIPTIONS. U.S. and Canada, call (800) 827-0323; elsewhere, call (815) 734-1116. Or set your Web browser to www.airage.com/subscribe.html. **U.S.:** \$34.95 (one year), \$55.95 (two years). **Canada:** \$49.95 (one year), \$87.95 (two years), inc. GST, reg. no. 13075 4872 RT. **Elsewhere:** \$48.95 (one year), \$83.95 (two years). Prepayment required; Visa, MC and AmEx accepted.

EDITORIAL. Send correspondence to Editors, *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Email: man@airage.com. We welcome all editorial submissions, but assume no responsibility for loss/damage of unsolicited material. To authors, photographers and people featured in this magazine: all materials published in *Model Airplane News* become the exclusive property of Air Age Inc., unless prior arrangement is made in writing with the Publisher.

ADVERTISING. Send advertising materials to Advertising Dept., *Model Airplane News*, 100 East Ridge, Ridgefield, CT 06877-4606 USA; phone (203) 431-9000; fax (203) 431-3000.

CHANGE OF ADDRESS. To make sure you don't miss any issues, send your new address to *Model Airplane News*, P.O. Box 428, Mount Morris, IL 61054 USA, six weeks before you move. Please include the address label from a recent issue, or print the information exactly as shown on the label. The Post Office will not forward copies unless you provide extra postage.

POSTMASTER. Please send Form 3579 to *Model Airplane News*, P.O. Box 428, Mount Morris, IL 61054 USA.

BY GERRY YARRISH

The Predator's family affair

Earning its keep while prowling the skies over some of the world's most dangerous hot spots, the remotely piloted RQ-1 Predator UAV (unmanned aerial vehicle) has become a full-fledged frontline weapon of war! Going online as operational units in 1995, Predators have logged over 22,000

An airborne family outing? No; this is the Predator UAV preparing to launch two mini UAVs attached below its wing.



Research Laboratory-produced FINDER program was designed to evaluate the Predator's capability to carry and launch independently controlled and self-propelled mini-UAVs into hazardous conditions. During these initial tests, the smaller UAVs were released at about 10,000 feet and then executed preprogrammed, 25-minute missions before having to land.



The baby Predators are secured to external launch pylons attached to the underside of the Predator's wing. The mother ship brought the mini UAVs to an altitude of 10,000 feet for test launches.

flight hours, more than 8,200 of which have been in combat-area deployments. Part of this UAV's success can be attributed to its use of commonly available avionics and mechanical systems and its relatively inexpensive (but highly reliable) Rotax 4-cylinder engine. The Predator can remain airborne for 40 hours plus, and it eliminates the need to send a flesh-and-blood pilot into dangerous territory.

UAV aircraft were first used in the Gulf War more than 10 years ago, and they have more than proved their worth in the world of aerial reconnaissance. With continuing development of the Predator program, these tireless forward scouts have developed into offensive weapons and now have the ability to fire air-to-surface missiles at military targets—and to hit them with amazing accuracy! UAVs are no longer just eyes in the sky.

THE NEXT GENERATION

UAV combat capabilities took a giant step forward recently, when a Predator successfully launched a miniature UAV while in flight over Edwards Air Force Base, CA. This was the first time an operational UAV carried and launched a second, smaller airborne unit! Known as the Flight Inserted Detector Expendable for Reconnaissance (FINDER), these 57-pound baby Predators are stowed on external launch pylons attached to the underside of the Predator's wing. As part of the Defense Threat Reduction Agency's airborne sensor program, the Naval

Once they're launched, FINDERS can sample atmospheric conditions and help make environmental assessments by relaying real-time information to ground troops. To extend the FINDER capabilities, the next test phase will include the integration of an Aerospace SMC-manufactured Predator Infrared Narrowband Hyperspectral combat Assessor (PIRANHA) that will detect and identify the presence of various atmospheric compounds. Future plans include demonstrating simultaneous launches of FINDER UAVs



Above: a successful launch! Note that the mini UAV has a swivel wing that swings 90 degrees into position for flight shortly after launch.



Left: the mini UAV under way and under its own power.

from each wing to extend the Predator's post-strike information-gathering range and incorporating other payloads into the FINDER UAVs to diversify their mission profiles.

Operating in numerous combat areas throughout the world, the RQ-1 Predator system continues to meet U.S. military needs. From airborne surveillance and detection to weapons employment, the ever evolving Predator remains a versatile, multi-mission system that routinely proves its broad military usefulness on a daily basis. ✚